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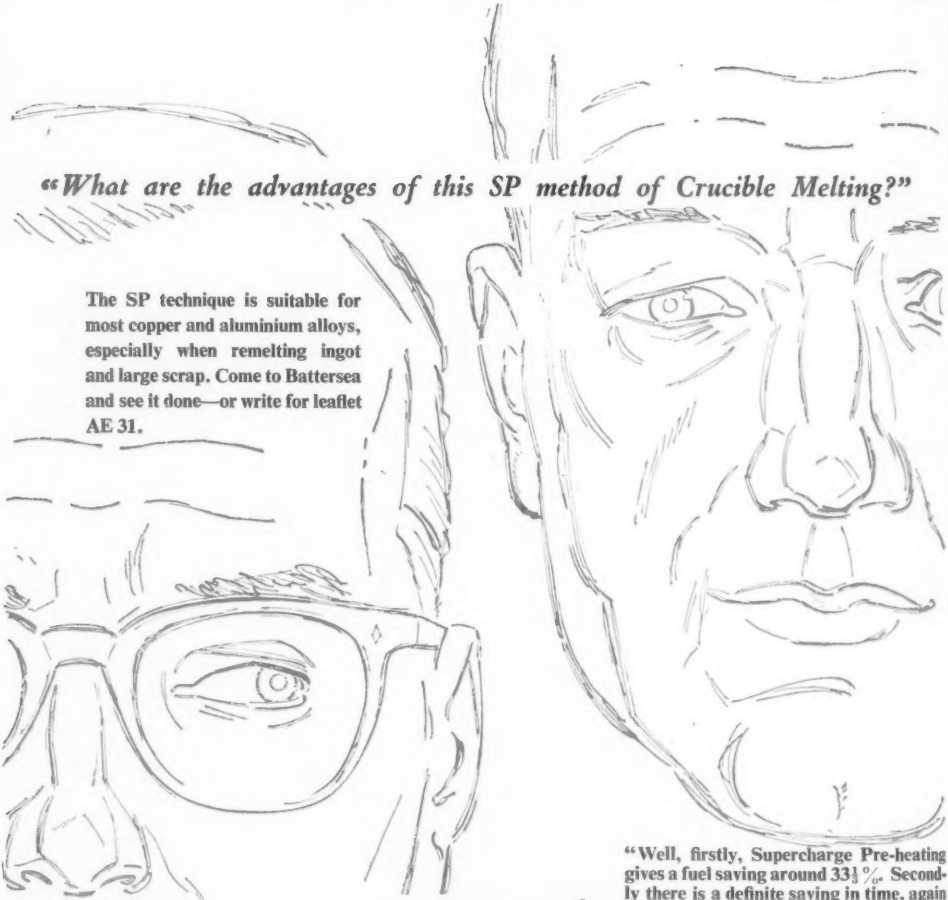

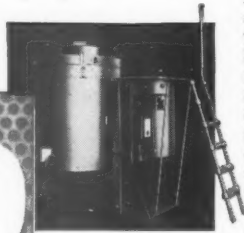

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FOUNDRY TRADE JOURNAL

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Dusseldorf Congress

Never in the long history of the foundry industry has an event received such world-wide publicity as has the forthcoming International Congress and Exhibition to be held in Düsseldorf during the opening weeks of next September. It is truthful to say that it must be only through a personal oversight that even the most remote "backwoods" foundry has not learnt of this great manifestation. Though it may not attain the proportions of American conventions, we expect it to be the largest ever held in Europe. The *Verein Deutscher Giessereifachleute* and GIFA, the exhibition organizers, merit warm congratulations on their initial propaganda. Its success in this country has been outstanding and a large delegation is promised. Even the Americans, who normally restrict their mass visits to occasions when an International Congress is held in Paris, are sending a sizeable delegation.

In this country, doubt in high circles has been expressed as to the wisdom of holding international conferences and exhibitions simultaneously, on the grounds that (1) it throws too great a strain on the organizers and (2) that the exhibition takes too many people away from the technical sessions, especially those not too familiar with the language of the Congress. The VDG has overcome most, if not all, of these difficulties by slightly extending the period of the Congress, by careful timing and by the provision of simultaneous translation at the technical sessions. In the recent past, for a foreigner participating in an international congress in Europe, the existence of an exhibition was more than welcome. In Florence, for example, where but few of the visitors from this country could follow the language, the time spent in the exhibition was particularly rewarding.

Whilst the preponderating number of exhibits at Düsseldorf will be German, there are several British stands and foundrymen from this country should make a point of visiting them, as their enterprise in showing merits a maximum of support. The Germans are pastmasters at staging exhibitions and it will be found that in the non-commercial sections, especially Hall "P," not only the products of the German ferrous foundry industry will be shown, but also what has been done in that country in designing for casting. Moreover, there is to be the *Zentrale für Gussverwendung* which we gather to be a bureau of information on castings. It would be interesting to ascertain just how this operates and whether its emulation could be of benefit to this country. Again, in Hall "N," there are to be special exhibitions on education, dust and noise suppression. It will be interesting to compare the dust-suppression exhibits with the great work which has been undertaken both here and in America. It is certain that many surprises await those fortunate enough to make the visit to Düsseldorf.

Oxygen in Steelmaking

Last week, a unique event took place at Bridgewater House, the head office of the British Oxygen Company, Limited, when Major the Rt. Hon. Gwilym Lloyd-George opened—by press button—the company's new factory at Margam. Thereafter, the plant was demonstrated by means of television to the assembled Press. The plant makes 100 tons of oxygen each day and the tests are so promising that a further plant to manufacture a further 200 tons is now being built. Moreover, other large steel works are also embarking on similar projects. The system now being used differs from earlier applications in as much as the gas is introduced through the roof to the open-hearth furnaces by means of a water-cooled tube. The roof at the point where the pipe enters is of special high-grade refractory and this, too, is water-cooled. Whilst there is no improvement in the quality of the steel made, there is also no added deterioration in the life of the furnace refractory. What it does accomplish is a 15 per cent. greater yield of liquid metal each day at a minimum outlay of capital cost.

Innovations in steel making have their repercussions on ferrous foundry practice, and already a number of steel foundries are using the oxygen in their electric furnaces, and it is stated to result in 10 per cent. increased output. For cupola practice, operating with a two per cent. oxygen-enrichment blast, the claim made in this case is 20 per cent. increased production. The earlier part of the televised programme was somewhat marred, the reception being due—it was said—to the atrocious weather at Margam. However, the part dealing with steel making using the oxygen blow was well received and the questions posed in London were clearly answered at Margam. It seemed to solve the question of organizing works visits for viewers who are comfortably seated in an armchair.

Film Review

Mining for Nickel, 18-mm., sound and colour film, running time 45 min., presented by the Mond Nickel Company, Limited, Thames House, Millbank, London, S.W.1. It was made for the parent company, International Nickel Company of Canada, Limited, by Film Graphics of New York.

The film opens with a brief description of the first discovery of the vast nickel/copper sulphide deposits in the Sudbury district of Ontario, Canada, in 1856, and continues with a detailed description of the modern exploration methods and mining techniques used to-day, when the production of nickel ore from the company's mines has grown to nearly 15,000,000 tons per year, with underground working totalling some 400 miles. Shaft sinking and drifting operations were filmed at the Levack mine; square-set, blast-hole and open-pit operations were taken at the Frood-Stobie Mine; the shrinkage and cut-and-fill practice at Garson Mine and caving operations at Creighton Mine.

This film should certainly reach its objective—that of demonstrating the magnitude of the operations and the immense effort made by the company to maintain and increase nickel production. In fact, the reviewer found the stress placed on the immensity of the projects rather overwhelming, providing more than could be comfortably digested while viewing the film. Possibly the omission of some of the dissertation on the various mining techniques would help to lighten the atmosphere for non-mining audiences, and the reviewer includes foundrymen in this category.

Longest Casting in the World?

Probably the longest "casting" of its kind in the world—a steel billet, 100 ft. in length—has begun its journey from Barrow to the International Foundry Exhibition at Düsseldorf. The billet, cast by the continuous process which has been the subject of experiment and development at Barrow Steel Works, Limited, for rather more than three years, would have been longer had it not been for problems of transportation. Its original length of 140 ft. would have necessitated the use of three cranes at Liverpool docks. As it is, two cranes will have to handle this unusual cargo when it is transhipped. To carry it by rail has required two bogie bolster wagons and special attention had to be given to the loading method to ensure safe transit.

The billet is of 2-in. square cross-section and was cast at what is claimed as the fastest speed of any plant in the world—20 ft. per min., said to be six to eight times as fast as that of any other plant.

Though made for exhibition purposes, the billet has proved what can be done by continuous casting and it would appear that the only limit to length is the production shop floor. The billet will be shown on another firm's stand at the International Foundry Exhibition, but will be appropriately "credited" to the Barrow concern as the place of manufacture. After being on show at Düsseldorf the billet will later be featured at another exhibition in Belgium. It is being carried in the Dutch motor-vessel Texelstroom at Liverpool, due to sail to-day (Thursday). The billet will not be returned to Barrow; it will probably be shown at other trade fairs on the Continent.

New Scottish Nuclear Power Station

A nuclear energy generating station is to be built by the South of Scotland Electricity Board during the next five or six years. Several possible sites for the station are now being examined along the Ayrshire coast.

The station, which will contain two nuclear reactors of the graphite moderated gas-cooled type, will be capable of providing sufficient heat to generate from 250,000 to 300,000 kw of electrical power. It is planned to bring the first reactor into operation in 1961 and the second in 1962, and it is calculated that when completed the scheme will effect a fuel saving of more than one third of the board's present coal consumption, or about 1,000,000 tons a year.

The cost of the project will be about £35,000,000. Specifications and invitations to tender have already been issued to four manufacturing groups which have been formed to supply and erect all the plant and equipment comprising a nuclear generating station, and tenders are expected to be received not later than the spring of 1957.

Honour for the Editor

During the International Foundry Congress at Düsseldorf in September next, the Editor of the FOUNDRY TRADE JOURNAL, Mr. V. C. Faulkner, past-president of the Institute of British Foundrymen and of the International Committee of Foundry Technical Associations, is to have conferred on him honorary membership of the German Foundrymen's Association.

Foundry Dust*

By W. B. Lawrie, M.B.E., M.Sc., F.R.M.S., A.I.M.; A. T. Holman, O.B.E., J.P., M.I.Mech.E., and F. F. L. Morgan, A.C.S.M.

Certain fundamental conceptions governing the control of dust are briefly dealt with in relation to the development of the low-volume, high-velocity ventilating system. This new local-exhaust method is described and reference is made to the tools and processes to which it has been applied. Four new applications of the system are given and illustrations taken from the original 35-mm. film negative used for development purposes, show the dust control achieved on a pneumatic chisel, a surface grinder, a portable grinder and a transverse swing-frame grinder. Preliminary dust counts are also included.

Introduction

Since the publication of the Garrett Report[1] in 1947, great efforts have been made to devise satisfactory methods of suppressing the dust clouds which are often produced when castings are made. These efforts have resulted in certain fundamental changes in the underlying conceptions of dust suppression, in new research methods and in the development of original devices for the control of dust. The term "dust suppression" is now used to designate all those methods by which the density of atmospheric dust clouds can be reduced. This is a matter of some importance, because these methods can all be placed in one of two main groups. The first group contains the dust-elimination techniques, while the second consists of dust-control measures. If an undesirable dust cloud must be suppressed, the elimination techniques should always be considered first. This is because the best way of suppressing dust is to stop making it. It is also very often the most difficult way, but where it can be done it results in the best possible working conditions. An example of this approach is to be seen in the wet de-coring bar[2] where water is used to wet cores before they are knocked out of the casting. Dust can also be eliminated from dressing shops by so improving moulding methods as to give a better surface finish on castings. This results in less dressing and, in consequence, less dust.

In cases where all the dust cannot be eliminated, it may still be possible to eliminate the particularly dangerous fractions of the total dust-cloud. This was done in one case, where the use of silica flour for parting powders was prohibited[3]. Dust elimination is generally a matter of foundry practice. It is therefore impossible to discuss it in general terms, and the field is far too wide even to be summarized in a single paper. It should, however, always be borne in mind, in the context of each individual case, when efforts are being made to suppress dust.

Dust Control Techniques

The second group of methods consists of dust-control techniques. These are often the only practicable methods, and even when the elimination methods have been applied to their limit, there will still frequently be a need for the control methods. Local exhaust ventilation is perhaps the most useful method of dust control and so a great deal of attention has been given to the development of more efficient ventilating systems.

* Paper read before the Slough section of the London branch of the Institute of British Foundrymen, Mr. J. Wood presiding.

MR. HOLMAN, O.B.E., J.P., M.I.MECH.E., chairman of Holman Bros., Limited, Camborne, was born in 1893 and educated at Blundell's School and Birmingham University, supplementing his training by apprenticeship in the shops at Camborne and Alfred Herbert, Limited, Coventry. From 1952 to 1955, he was a member of the Council of the Institution of Mechanical Engineers; he is a J.P., and in 1944 he received the award of the O.B.E. Mr. Holman has presided over the Cornwall Technical College since its inception in 1928 and is vice-chairman of the Camborne School of Metalliferous Mining.

MR. LAWRIE, M.B.E., M.SC., F.R.M.S., A.I.M., HM Engineering Inspector of Factories, was previously a lecturer in ferrous metallurgy at the Cumberland County Technical College, Workington. Other appointments he has held are assistant to the Bessemer section manager, and assistant to the steelworks superintendent of the Workington Iron & Steel Company, Limited. Mr. Lawrie is a member of the Joint Advisory Committee on Conditions in Iron Foundries (the Garrett Committee) and of many other "foundry" committees including the Foundry Atmospheres Committee.

MR. MORGAN graduated at the Camborne School of Mines in 1928. After some years of practical mining experience, he joined Holman Bros., Limited, in 1934 and, except for the war period spent with the Special Forces and Royal Engineers, his duties during 20 years of overseas experience have taken him to all continents. In 1955, Mr. Morgan was appointed general manager of Dustuctor Company, Limited. Since giving the Paper, he has been appointed assistant to the managing director of the Climax Rock Drill & Engineering Works, Limited, an associate company of Holman Bros.

Foundry Dust

Foundry dust clouds consist of particles of widely varying size, but the main effort has been devoted to the control of particles within the respirable size range (*i.e.* less than 5 microns in diameter). These particles are invisible in ordinary lighting conditions and so a technique was developed by means of which they could be both seen and photographed on 35-mm. cinematograph film[4]. This observation and photographic technique has been used extensively for development work, and the new tools described were developed by means of it. In consequence, the new methods have been devised on a study of the movement of dust and not air, and this is a matter of great importance if dust is to be controlled. The illustrations in this Paper have been taken from the 35-mm. cinematograph film negative used during the development work.

Low-volume, High-velocity Exhaust

Portable tools have offered a particularly difficult problem in dust control by reason of their portability. Exhaust ventilation should always be applied close to the point of origin of the dust, but this was not possible by conventional methods when the point of origin was moving with the tool over relatively large distances. This was because the large volumes of air normally used for ventilation purposes needed ducts of such large diameter that they could not be attached to portable tools. Attempts had been made to control the dust by working in front of booths or on benches fitted with exhaust ventilation[4], but this was not always convenient, and in the case of heavy castings was sometimes impossible.

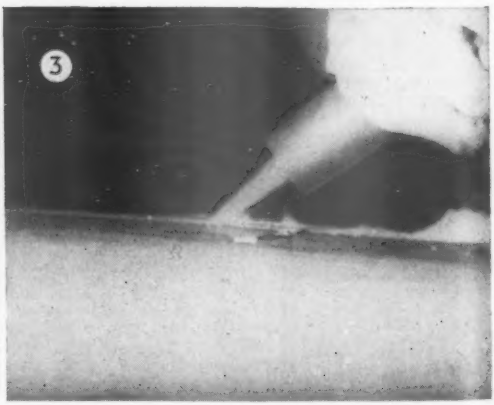
Early work on the pedestal grinder[5] showed that the fine dust was carried round the wheel face at a velocity which approached half the peripheral velocity of the wheel. This meant that the low-velocity air streams normally used in conventional exhaust-systems would not be capable of capturing this dust if they were applied close to its point of origin. It was evident, therefore, that at least two conditions would have to be met if local exhaust ventilation were to be applied to portable tools. In the first place, very small ducts would be needed, and second, the ventilating air would have to move fast enough to control the dust at its point of origin.

There was no known method of controlling the dust produced by pneumatic chisels or portable wheels when these tools were in use on very heavy castings. Consequently, there was a very real incentive to develop new methods in these cases, and the use of small quantities of air, moving at very high velocity, represented an original approach to the problems of local exhaust ventilation which

FIG. 1.—*Pneumatic chisel fitted with a rubber sleeve and extraction tube for dust collection and exhaust.*

FIG. 2.—*Pneumatic chisel cutting "flash" from a grey-iron casting which had been shotblasted. No exhaust ventilation was in use.*

FIG. 3.—*Rubber extraction sleeve fitted to the chisel and exhaust system operating. All other conditions as in Fig. 2. Note, dust flowing into the sleeve ducts above and below the cutting edge of the chisel.*



was really fundamental. The method was first used for percussive rock drills[6], when the dust produced by rock drilling was extracted through the hollow drill steel and the hammer, by a ventilating air-stream moving at 16,000 to 18,000 ft. per min. This system used a high vacuum which was developed by an annular air ejector designed to give a static vacuum of 13 to 15 in. of mercury and a running vacuum of 10 in. of mercury.

A series of research and development projects was then instigated, and has since resulted in the application of the system to a range of foundry tools and processes.[7, 8, 9, 10] In the case of portable tools, the air volumes employed vary from 6 to 40 cub. ft. per min., and the ducting diameters from $\frac{1}{8}$ to $\frac{1}{4}$ in. The calculated air velocity in the duct is of the order of 12,000 ft. per min., and the vacua used in the early work varied from 5 to 10 in. of mercury. In other applications of the system, larger quantities of air were needed, although they still represent relatively low volumes when compared with conventional practice. A swing-frame grinder took 250 cub. ft. per min. at a vacuum of about 5 in. of mercury, and fumes given off when fluxing magnesium were controlled by 160 cub. ft. of free air per min. at 1 in. of mercury.

Vacuum Systems

The original work, therefore, used vacua from 1 to 10 in. of mercury. One object of subsequent work has been to reduce the vacuum needed, and the further research and development has in fact resulted in the use of vacua in the range 1 to 5 in. of mercury. During the research and development stages, the necessary vacuum has generally been taken from annular compressed-air ejectors. These ejectors have been used as a matter of convenience, because they were capable of vacua up to 18 in. of mercury with air volumes up to 150 cub. ft. of free air per min. A further great advantage for experimental purposes was that both vacuum and air flow could be varied readily over a wide range. On the other hand, rotary exhausters and fans have also been used, and in practice the source of vacuum to be applied in a given system will be determined by local conditions.

Pneumatic Chisel

The system was first applied to a pneumatic chisel[7] when it was shown that fine dust could be controlled by about 4 or 5 cub. ft. of free air per min. under a vacuum of 10 to 15 in. of mercury, the duct velocity being about 12,000 ft. per min. In the early work the ventilating air was applied in three ways as follows:—(1) Through a separate duct held over the operator's hand; (2) through a duct bound on to the chisel side, and (3) through a hollow chisel.

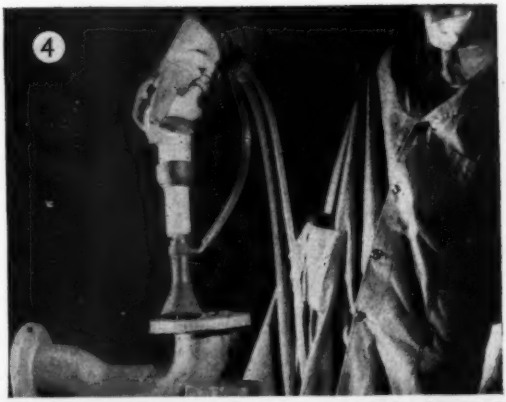


FIG. 4.—*Pneumatic chisel, showing conical extension duct fitted over the rubber sleeve and Polythene hose connected to the sleeve.*

FIG. 5.—*Removing sand from a grey-iron casting by applying the chisel vertically over horizontal surface. No exhaust ventilation was in use.*

FIG. 6.—*Removing sand from the casting, with the new exhaust system in use and the conical extension duct fitted.*

Foundry Dust

Each method was shown to be satisfactory so far as the control of fine dust was concerned, and it was then decided that the next step was to consider the problem of engineering practicability in the various conditions in which the chisel was used. It was clear that:—

(1) The efficiency of dust control must be maintained, especially in the respirable size range.

(2) It would be a considerable step forward if larger quantities of much coarser dust could be controlled when stripping heavy castings.

(3) It would also be necessary to apply the system to long chisels.

(4) The vacuum should be reduced if possible.

(5) The simplest method of application would obviously be the best.

(6) It was desirable to apply the system in such a way that it could be fitted to existing equipment without major alteration to that equipment.

Chisel Sleeve

New designs have now been evolved in an attempt to meet these requirements. The chisel has been fitted with a rubber sleeve and the ventilating ducts have been incorporated in the sleeve wall in such a manner that there is one pair of ducts above and one pair below the cutting edge of the chisel. The sleeve is held in position on the chisel by means of a ring which fits a groove ground in the chisel itself. The dust, which is collected by the ducts, is led away through a $\frac{1}{2}$-in. dia. plastics hose. The end of the ducts coincides with the end of the sleeve, and this should be kept within about one inch of the cutting edge of the chisel, so that as the chisel is ground back the sleeve should be cut to fit it. A vacuum of 5 in. of mercury is sufficient, at this value, when the system will extract 6.5 cub. ft. of free air per min. Fig. 1 shows the tool ready for use. Fig. 2 shows the dust produced when cutting flash from a grey-iron casting which had already been shotblasted; no exhaust ventilation was in use when this picture was taken. Fig. 3 shows the dust under control when using the sleeve on a similar casting in the same condition. The fine dust is visible as it flows into the ducts above and below the chisel.

Conical Extension Duct

When the machine is used for work which produces much larger quantities of dust, a conical rubber extension-duct can be fitted over the sleeve. This cone, which is shown in Fig. 4, can easily be pushed over the sleeve. Fig. 5 shows the conditions which result when a chisel is worked vertically over a horizontal surface which carries burnt-

FIG. 7.—*Chisel fitted with the sleeve and a conical extension duct for use when stripping a heavy steel casting—conditions before starting work.*

FIG. 8.—*Stripping the heavy steel casting with the chisel, with no exhaust ventilation in use.*

FIG. 9.—*Stripping the same casting with the chisel when fitted with the sleeve and conical extension duct and the exhaust ventilation system working. Only heavy particles can be seen flying from the chisel.*

on sand. In Fig. 6, the same process is being carried out on a similar casting, but exhaust has been applied to the sleeve. The high-velocity air-stream still extracts fine dust generated at the chisel point, but it also serves as a secondary forcing jet to induce an air stream of lower velocity around the edge of the cone. This secondary stream collects large quantities of heavier dust which would otherwise escape.

Heavy steel castings are commonly stripped by means of pneumatic chisels, when large quantities of sand and dust are released from the casting. This work has now been done with a chisel fitted with the sleeve and extension duct; Fig. 7 shows conditions immediately before work started and Fig. 8, conditions when stripping without ventilation of any kind; Fig. 9 illustrates the new system in use. Some heavy particles can be seen as they are projected away from the work but the main dust cloud is under good control, and the exhaust system is collecting large quantities of dust in a very wide size range. This work was done in a dressing shop. The observations, which were made in a laboratory, were confirmed by dust counts and these results are given in Tables I, II and III.

Portable Surface-grinder

The low-volume, high-velocity system has already been applied to a portable surface-grinder[9], when the exhaust air was extracted through ports placed all round the inner edge of a ring which completely surrounded the wheel. Further work has shown that this ring duct need not fit all round the wheel, and the dust can be controlled if a section of the duct is cut away as shown in Fig. 10. This allows the operator to see part of his wheel, and also allows the wheel to be used close up to projections and in corners.

Fig. 11 shows the machine in use on grey cast-iron without ventilation and the dust can be seen leaving the work. In this illustration, the driving motor of the wheel has been covered to diffuse the compressed-air exhaust as the machine is driven by a compressed-air motor. This was done so that the dust would not be dissipated, but would flow along its natural path in still air. Fig. 12 shows the machine in use on grey iron with the ventilating system working; the dust is obviously under good

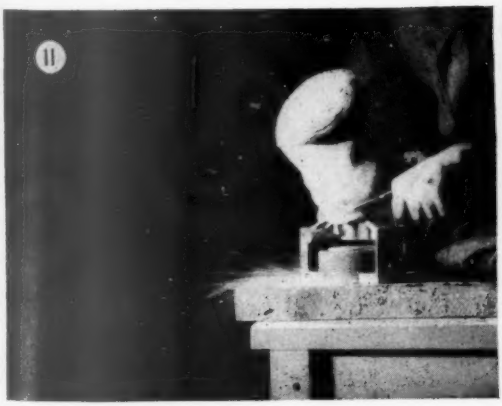
TABLE I.—*Owens Jet Counts.*

Sample No.	Remarks.	Particles per ml.
1	General atmosphere before start	200
2	Chisel, with cone, 5 in. Hg.	200
3	Chisel, without exhaust	8,800
4	Chisel, with sleeve, 5 in. Hg.	300
5	Chisel, without exhaust	5,000
6	Portable grinder, exhaust " on "	800
7	Portable grinder, without exhaust	8,000
8	General atmosphere (with room fan "on")	400
9	Surface wheel, with exhaust	300
10	Surface wheel, without exhaust	1,500
11	General atmosphere	300
12	Swing-frame grinder, with exhaust	500
13	Swing-frame grinder, without exhaust	6,000

FIG. 10.—*Ventilation system fitted to a portable surface-grinder. Part of the ring has been cut away to facilitate the use of the wheel.*

FIG. 11.—*Grinding a grey-iron casting without using the ventilating system.*

FIG. 12.—*Grinding the same casting with the ventilating system operating.*



Foundry Dust

TABLE II.—*Konimeter Counts.*

Sample No.	Remarks.	Particles per ml.
1	General atmosphere before start	52
2	Chisel, with cone, 5 in. Hg.	72
3	Chisel, without exhaust	286
4	Chisel, with sleeve, 5 in. Hg.	34
5	Chisel, without exhaust	194
6	Portable grinder, exhaust "on"	62
7	Portable grinder, without exhaust ..	428
8	Portable grinder (30 sec. after 7)	318
9	Surface grinder, with exhaust	74
10	Surface grinder, without exhaust ..	512
11	General atmosphere	44
12	Swing-frame grinder, with exhaust ..	110
13	Swing-frame grinder, without exhaust ..	460

TABLE III.—*Thermal Precipitator Counts.*

Sample No.	Remarks.	Particles per ml.
1	Chisel, with cone, with exhaust	268
2	Chisel, without exhaust	5,534
3	Portable grinder, with exhaust	873
4	Portable grinder, without exhaust ..	9,420
5	Surface grinder, with exhaust	184
6	Surface grinder, without exhaust ..	3,216

control. The air exhaust port from the driving motor is still covered but later experimental work showed that the dust-control system is equally efficient whether this port is covered or not, the point being, of course, without significance in the case of electrically driven machines.

The observations and photography indicated a high level of dust control when the machine was used in laboratory conditions and grey iron was being ground. These observations were confirmed by means of dust counts and these results also are given in the tables previously referred to. The ventilating system extracts 33 cub. ft. of free air per min. at a vacuum head of 5 in. of mercury.

Portable Grinder

The new system was also applied to a portable grinder[7] by a scheme in which the dust was extracted through ports in a peripheral duct fitted into the wheel hood. The first hood covered much of the wheel and was only suitable for straight work. Later, a much shorter peripheral duct was used and this left a large part of the wheel surface open[10]. Finally, an extractor head was developed, so that the maximum amount of wheel-face may be exposed in cases where this is necessary.

The device is shown in Figs. 13 and 15; the head is provided with a port on its inner surface to strip the fine dust from the wheel face. An aerofoil vane is added in this port to improve the efficiency of stripping. Heavier dust particles and sparks flow along the work, tangentially to the wheel-face and this stream of sparks and dust is collected through a second port in the lower surface of the extractor head. The head is provided with a roller device so that it will run more easily over the work and as the tangential stream of dust and sparks strikes this roller it decelerates before being collected by the port immediately above the roller.

FIG. 13.—*Extractor head fitted to a portable grinding wheel.*

FIG. 14.—*Grinding grey iron without exhaust ventilation.*

FIG. 15.—*Grinding grey iron with the extractor head fitted and operating.*

The extractor head is easily adjustable to suit all wheel diameters from 8 in. down to 2½ in., so that it can be kept in close proximity to a wheel as it wears. A head suitable for wheels 1 in. wide extracts 40 cub. ft of free air per min. at 5 in. of mercury, and this air is taken, with the dust, through a ¾-in. dia. plastics duct.

Fig. 14 shows a 6 in. dia. wheel grinding grey iron without exhaust ventilation, and Fig. 15 shows conditions when the machine is grinding the same piece of iron with the new ventilating system in use. The heavy dust cloud which can be seen in Fig. 14 does not appear in Fig. 15 because it is being controlled by the extractor head. Dust counts, taken in laboratory conditions and given in Tables I, II and III, confirmed the observations.

Swing-frame Grinder

Fig. 16 illustrates a transverse swing-frame grinder in which the wheel is mounted at right angles to the boom. An extractor head was fitted to this machine, and can be seen on the left of the wheel below the guard edge in the illustration. This head was similar to the one used on the portable grinder but was double the size. It extracted 150 cub. ft. of free air per min. at a vacuum of 5-in. of mercury, and was connected by a lightweight hose of 1½-in. dia. Fig. 17 shows the dust cloud generated when grinding grey iron without ventilation and Fig. 18 indicates the dust control achieved by the use of the extractor head. This photograph was taken when the exhaust system was operating with a vacuum of just under 4-in. of mercury—rather a low value for the system, which should be run at 5 in. of mercury. The visual evidence was confirmed by dust counts taken in laboratory conditions, and these counts also are given in the tables.

Dust Counts

Preliminary dust counts were made on samples collected when the machines were working under laboratory conditions. Air samples were taken by an Owens Jet Counter, a Konimeter and a Thermal Precipitator and the counts were made without incinerating the samples. This was done in order to estimate the efficiency of the dust-control system on the total dust cloud produced. The machines were run singly in a laboratory set-up; in consequence, no estimate could be made of the possible build-up in dust concentration that might result from using large numbers of machines over long periods. On the other hand, the dust counts indicated the conditions resulting from the use of one machine in clean air, and there was no contamination by dust from other processes, as there would have been had the counts been done on samples taken in an ordinary dressing shop. The samples were taken under illumination at about 6 in. from the position of the dust-control unit. They indicate therefore the efficiency of dust collection by that unit. Samples of the general atmosphere were also taken at breathing level, at

FIG. 16.—*Extractor head fitted to a transverse swing-frame grinder.*

FIG. 17.—*Swing-frame grinder employed on grinding grey iron, without exhaust ventilation.*

FIG. 18.—*Grinding grey iron with the extractor head fitted and operating.*

intervals throughout the work, the counts from these latter samples remained virtually constant throughout. All the samples were counted to the limit of visibility under light-field illumination.

Conclusions

1. Low volumes of air moving at high velocity will control dust within the respirable size range.
2. Recent work indicates that the vacuum need not exceed 5 in. of mercury.
3. The low-volume, high-velocity dust-extraction system has been applied to a pneumatic chisel by means of a rubber sleeve.
4. Where large quantities of dust have to be controlled a conical extension duct can be fitted to the sleeve.
5. In addition to dust control, operators have said that the sleeve damps the vibrations of the tool and so provides a much more comfortable grip. The possible influence of this on Renaults disease ("dead hand") has not yet been investigated.
6. A portable surface-grinder has been fitted with a dust-control unit which allows part of the wheel to be exposed.
7. A portable grinder has been fitted with an extractor head which gives good dust control, and at the same time exposes most of the wheel for work in difficult conditions.
8. A transverse swing-frame grinder has been fitted with an extractor head which provides dust control for the machine.
9. The illumination technique was used throughout the development work and observations and photographs indicated the dust control achieved.
10. Preliminary dust counts confirmed the observations made.

Acknowledgments

The Authors are indebted to Mr. R. Horton and Osborn Foundry & Engineering Company Limited, Sheffield, for permission to photograph the chisel in use on a steel casting. Mr. Lawrie is indebted to Sir George Barnett, H.M. Chief Inspector of Factories, for permission to engage in the work and publish the results, and also to Mr. T. W. McCullough, O.B.E., H.M. Deputy Chief Inspector of Factories, for encouragement to proceed with the work on behalf of the Foundry Committees of which Mr. McCullough is chairman. He is also under obligation to the staff of the Photographic and Reproductions Branch of the Air Ministry for assistance with the photography.

REFERENCES.

[1] Report of the Joint Advisory Committee on Conditions in Iron Foundries. H.M. Stationery Office, London, 1947.
[2] W. H. White, "Dust Problems in Dressing and Fettling Shops. Harrogate Conference on Foundry Ventilation and Dust Control, British Cast Iron Research Association, 1955.
[3] The Foundries (Parting Materials) Special Regulations, 1950.
[4] R. F. Ottignon, and W. B. Lawrie. "Observation and Control of Dust in Foundry Dressing Operations." *Proc.* Inst. Brit. Foundrymen, **44**, 1951.
[5] W. H. White and W. B. Lawrie. "External Dust Control for a Pedestal Grinder." FOUNDRY TRADE JOURNAL, 1952, **93**, Nos. 1892 and 1893.
[6] W. B. Lawrie, A. T. Holman and E. B. James. "Observation of Dust in Mines by an Illumination Method." *Trans.* Inst. Min. and Met., 63, **4**, 1953-54.
[7] W. B. Lawrie, A. T. Holman and E. B. James. "Observation and Control of Dust at Portable Abrasive Wheels and Pneumatic Chisels." *Proc.* Inst. Mech. Eng., 1954, **168**, No. 21.
[8] W. B. Lawrie, A. T. Holman and E. B. James. "Observation and Control of Dust on a Pneumatic Chisel, a Portable Abrasive Wheel and a Bench Grinder." FOUNDRY TRADE JOURNAL, **99** No. 2047, 1955.
[9] W. B. Lawrie, A. T. Holman and E. B. James. "Low-volume High-velocity Exhaust." Harrogate Conference on Foundry Ventilation and Dust Control—British Cast Iron Research Association 1955.
[9] W. B. Lawrie. "A Low-volume High-velocity Exhaust System." British Steel Castings Research Association Conference, York, 1955.

London Aluminium Board Changes

At the requisitioned extra-ordinary meeting in Birmingham on July 27 of the London Aluminium Company, Limited, Mr. J. A. Orme was elected to the board. Mr. Orme is a director of the Midland Aluminium Company, Limited, which holds half the capital of London Aluminium.

For his election, 505 shareholders (978,842 shares) voted in favour and 371 (124,237) against. Mr. Orme thus had the support of the majority of outside shareholders without the support of Midland Aluminium, which holds 800,000 shares. On a show of hands eight voted for and five against.

Col. C. A. B. Lindop, the chairman, and Mr. E. W. Wynn and Mr. G. Mortimer then announced their resignation from the board and, at a subsequent directors' meeting, Major C. R. Dibben was elected chairman in place of Col. Lindop.

A CONTRACT for the two largest steam generating sets yet ordered for installation in Australia has been placed with the English Electric Company, Limited, by the Electricity Commission of New South Wales. The value of the contract is over £1,500,000. The turbo-generator sets, each of 100.000 kw, are to be erected in the Tallawarra power station, near Port Kembla, one of the largest steel centres in Australia.

South Wales Ports Trade Down

Traffic handled at the South Wales ports of Cardiff, Swansea, Newport, Barry, Port Talbot, Penarth, and Lydney during the four weeks ended July 15, 1956, totalled 1,518,138 tons, which was 64,269 tons less than the figure for the corresponding period of last year. Inward traffic, which amounted to 824,830 tons, fell below last year's corresponding total by 64,069 tons, for which a decrease of 43,329 tons in iron and steel goods was mainly responsible. Among the traffics which showed increases were iron ore (9,570 tons) and other ores (4,960 tons).

A decrease of 200 tons was experienced in outward cargoes, which totalled 693,308 tons. Some of the heaviest losses were recorded in coal and coke (26,169 tons), and patent fuel (8,342 tons). There were gains in tinplate (3,471 tons) and shipments of iron and steel manufacture also advanced slightly.

ONE THIRD of the available space in the British industrial pavilion at the 1958 Brussels International Exhibition has already been booked by UK trade associations and individual firms. A further third is stated to be the subject of advanced negotiations, but the Federation of British Industries, which is organizing the pavilion, emphasizes that only a limited time is available for negotiations as firm plans have to be submitted in two months' time.

Ablation Centre at a Tyneside Foundry

Inauguration by an Official Opening for Employees and their Families

An interesting event took place at the iron foundry of Charles W. Taylor & Son, Limited, South Shields, when a new ablution centre, recently put into operation at these works, was open to the friends and relatives of the workpeople by the courtesy of the directors. The fact that some 250/300 men and women took advantage of the opportunity of seeing what can be done to improve the facilities for the workpeople indicates the amount of interest shown. It must have been very encouraging to Mr. C. W. Stewart, the managing director, whose idea it was to have an "open day," to see exhibited this expression of loyalty and team spirit. In conversation with many of the workpeople and their wives, the writer formed the opinion that the amenities now provided have raised considerably the morale of the employees.

The accommodation provided in the new building is for 151 men and apprentices and includes locker rooms for both clean and dirty clothes, wash basins, foot baths (Fig. 1), showerbaths, and toilets. The planning of the building was hampered by the restricted size of the site and by its awkward shape, but the architects, L. J. Couves & Partners of Newcastle-upon-Tyne, have made remarkably good use of the space available. It was not possible to provide separate locker-rooms for clean and dirty clothes, but each locker is partitioned down the centre to keep the two apart. The lockers are heated by hot filtered air, carried in ducts underneath. The air is under pressure and forces its way out of louvres in the top so that the clothes can be kept warm and dry. Hot air is also blown into the showerbaths and washing room through anemostats in the ceiling and extracted through Vent-Axia fans in the windows.

Constructional Details

In addition to the ablution centre, the new building includes a conference room and a small anteroom, and hot air is ducted through to these also, but generally the heating is by "Vectair" cabinets through which hot water from a coke-fired boiler passes. The same boiler supplies the domestic hot water by passing it through a calorifier. All this work, including the cold water supply, was carried out by the Brightside Foundry & Engineering Company, Limited. The floors in the lavatories and showers are of Terrazzo tiles and the locker-room floor is red "Flexicrete," both laid by the Standard Pavements Company, Limited. Floors in the office part of the building are all wooden blocks to match those in the existing offices, the conference room and anteroom being finished and furnished in light oak. The external appearance of the building has been governed by the fact that it adjoins the old offices, and of course by economy. The total cost of the work was approximately £17,500 and the general contractor was George Thornton & Company, Limited, of South Shields.

Use of Amenities

Although the provision of baths and washing facilities for foundrymen is necessitated by Factories Act Regulations and involves considerable expense, there is no compulsion about their use. Foundrymen, like other craftsmen, are very conservative and hesitate to change customs that have developed over many years. However, quite apart from the good spirit which prevails at this foundry, it was soon realized that with the facilities provided the men could leave the works at the end of the day in a condition of cleanliness comparable with other members of the general public, and could use normal transport facilities without feeling sensitive about the condition of their clothes. It is more than probable that the wives of these foundrymen have contributed their influence and the response has been excellent and, with the exception of about seven, all the foundry staff are making full use of the amenities.

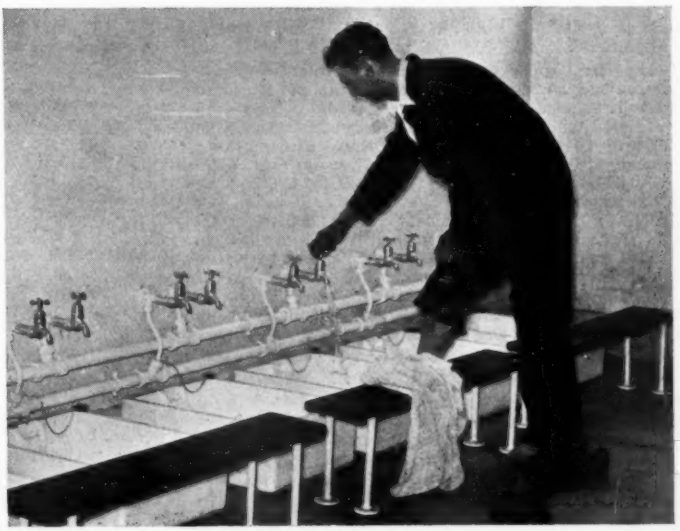


FIG. 1.—*New foot-baths in use at the foundry of Charles W. Taylor & Son, Limited.*

British and World Shipbuilding

Lloyd's Returns for June Quarter

Steamships and motorships under construction in Great Britain and Northern Ireland at the end of June totalled 334 ships of 2,028,132 tons gross, a decrease of 232,817 tons compared with the previous quarter, states Lloyd's Register of shipbuilding returns relating to merchant ships of 100 tons gross and upwards. The vessels included 99 steamships of 1,150,852 tons and 234 motorships of 877,130 tons. In other British Commonwealth countries there were under construction 14 steamships of 29,383 tons and 50 motorships of 99,099 tons. Oil tankers building in Great Britain and Northern Ireland totalled 62 ships of 833,301 tons, a decrease of 111,963 tons compared with the previous quarter. The present figure represents 41.1 per cent. of the total tonnage under construction in this country. Vessels building in the world numbered 1,534 of 7,223,004 tons (including six wooden ships of 799 tons), compared with 1,530 vessels of 7,009,179 tons in the March quarter. The total included 298 steamers of 3,212,492 tons and 1,230 motorships of 4,009,713 tons. Construction in hand in the principal districts of Great Britain and Northern Ireland is indicated in Table I.

TABLE I.—*Vessels under Construction in Principal Districts of Great Britain and Northern Ireland*

District.	June 30, 1956.		March 31, 1956.		June 30, 1955.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Aberdeen ..	19	21,204	19	21,755	22	24,567
Barrow ..	3	71,930	3	83,140	4	86,000
Belfast ..	19	206,170	22	261,731	18	223,690
Bristol ..	4	2,717	4	2,660	4	2,030
Clyde—						
Glasgow ..	70	419,750	75	459,127	75	443,224
Greenock ..	28	187,745	31	218,553	32	216,732
Dundee ..	6	44,410	5	36,410	6	35,110
Hartlepool ..	7	47,350	7	47,488	7	42,894
Hull	38	21,092	37	21,001	33	18,214
Leith	13	57,916	15	56,640	16	57,990
Liverpool ..	21	162,168	23	196,070	19	153,462
Middlesbrough	15	198,400	13	194,600	12	168,523
Newcastle-on-Tyne ..	34	372,589	37	397,066	37	391,570
Southampton	3	646	5	1,648	3	1,734
Sunderland ..	28	202,806	32	249,143	28	202,760

The sizes of steamships and motorships in parentheses under construction in Great Britain and Northern Ireland included the following:—100 to 1,000 tons, 13 steam (103 motor); 1,000 to 2,000 tons, 3 steam (21); 2,000 to 4,000 tons, 3 steam (12); 4,000 to 6,000 tons, 7 steam (16); 6,000 to 8,000 tons, 11 steam (36); 8,000 to 10,000 tons, 12 steam (33); 10,000 to 15,000 tons, 17 steam (13); 15,000 to 20,000 tons, 7 steam (1); 20,000 to 25,000 tons, 22 steam (nil); 25,000 to 30,000 tons, 3 steam (nil); 30,000 tons and over, 1 steam (nil).

Steamships and motorships under construction abroad at the end of June totalled 1,200 ships of 5,194,872 tons gross; an increase of 446,642 tons as compared with March. Figures are still not available for China, Poland and Russia.

A PRIVATE COMPANY, Newton Transmission Limited, has been formed with an initial capital of £100 in 50 £1 7½ per cent. cumulative redeemable preference shares and 50 ordinary £1 shares. The purpose is to acquire shares in Newton & Bennett, Limited, Newton Motor Products, Limited, and Power Jacks, Limited. The directors are Mr. Noel B. Newton, Mr Vernon A. Glover, Mr. George A. Turner, and Mr. Thomas L. Barnes.

Atomic Patents for Industry

Steps are being taken by the United Kingdom Atomic Energy Authority to promote the industrial development of atomic energy by bringing to the notice of industry many of the developments and inventions which have arisen out of the work of the authority's research and industrial groups. In its report for 1955-56, the Authority says that it has a substantial holding of patents and patent applications which may be useful not only in the development of nuclear power but for more general purposes in the chemical, engineering, metallurgical, and electronic-instrument fields.

As far as power reactors are concerned, the report considers that it will be four or five years before electricity will be produced from nuclear energy in any country on a strictly commercial basis. The first nuclear reactors to be built for the electricity authorities in this country may be the first in the world to comply with this description.

The Authority thinks that it is hardly to be expected that exports of nuclear reactors will reach a large volume over the next few years. There is already some demand from overseas countries for research reactors, but not of such magnitude as to affect significantly the total value of the engineering industry's annual exports. The report goes on to assume, however, that it is reasonable to expect that orders from overseas will follow, rather than precede the achievement of nuclear power on a competitive basis in this country.

Iron-ore Imports

Iron-ore imports in June, and the total for the first six months of this year compared with the corresponding period of 1955, are shown below.

Destination.	Month ended June 30.	Six months ended June 30.	
	1956.	1955.	1956.
	Tons.	Tons.	Tons.
Sierra Leone	67,290	335,125	360,480
Canada	308,923	334,847	638,603
Other Commonwealth countries and Eire	2,465	6,103	10,001
Sweden	355,127	1,664,398	2,016,970
Norway	5,032	41,182	42,782
Western Germany	—	23,896	3,008
France	48,172	330,832	325,786
Portugal	12,064	45,968	67,743
Spain	71,539	416,838	453,681
Algeria	119,916	1,159,083	751,386
Tunisia	64,410	358,458	389,224
French Morocco	32,020	139,415	221,301
French West Africa	38,711	284,784	356,591
Spanish Morocco	24,560	115,105	149,161
Liberia	23,110	133,070	176,648
Brazil	60,947	209,885	273,726
Other foreign countries	68,857	58,761	295,696
TOTAL	1,303,143	5,657,750	6,532,787

Latest Foundry Statistics

According to the *Statistical Bulletin* of the Iron and Steel Board, there has been a reduction in employment in steel foundries for the month ending May 5; the total was 20,120 as against 20,260 a month earlier. Compared with a year earlier there was a gain of 210. The average weekly output of steel castings during May is provisionally placed at 6,300 tons, the estimated figure for April; this would be 400 tons per week higher than last year.

Internal Chills in Moulds for Steel Castings*

By G. W. Miles, B.Sc., M.Met., A.I.M.

The introduction of metallic inserts into steel castings, whether as internal chills or as chaplets, involves careful consideration if these inserts are to do their work correctly without introducing undesirable features. Internal chills are introduced to overcome shrinkage in sections that cannot easily be fed, and to promote directional solidification, whilst the prime purpose of chaplets is to support cores if core prints cannot be used. Various factors are discussed and a short experiment to investigate the extent to which different-sized inserts and chaplets, such as are commonly used in practice, fuse into the casting has been carried out. This experiment indicates that there is an optimum size of chill relative to the size of casting if fusion with the casting is to occur and cracks, or blowholes, be avoided. Further, chaplets should be chosen both as regards the number and the size used, so that they just support the load placed upon them, when surrounded by molten steel, unnecessary mass being avoided; also, the fewer the number used, the fewer the possibilities of introducing defects. In general, unless great care is taken in the selection of internal chills for use in a particular casting, defects are likely to be introduced spreading some considerable distance into the casting, and if such attention is not devoted to the subject, alternative means of providing progressive solidification and feeding must be employed for the production of sound castings.

MR. G. W. MILES is attached to the research staff of Edgar Allen & Company, Limited. He commenced in the chemical laboratory of the Park Gate Iron & Steel Company, Limited, in 1942, where he received training in the various technical departments of this company. In 1950, after evening studies at Sheffield University and Rotherham Technical College, Mr. Miles obtained an external honours degree of B.Sc. (Eng.) (Met.) of London University. An associate of the Institution of Metallurgists, he enrolled in the post-graduate school of physical metallurgy at Sheffield University where, in 1954, he obtained the degree of M.Met.

In order to provide sound castings, use is sometimes made of metallic inserts in selected portions of the castings, and though the primary object of chaplets is to support cores, being metallic inserts they, too, must be considered under this heading. To ensure sound castings, adequate feeding of all parts of the casting must be provided, or directional solidification be arranged. More usually, of course, it is a combination of these principles since, because of intervening thin sections which freeze rapidly, some heavy sections will need suitably-located feeder-heads, but instances arise where such heads are not feasible and some form of chilling may be necessary to avoid shrinkage defects. The form and dimensions of such chills need to be carefully determined in relation to the specific section of the casting, since it is possible to over-chill as well as under-chill. Likewise, chaplets should be selected with care, only being used when necessary, so that the minimum number is utilized.

Among the factors which introduce difficulties in the production of sound castings are the large volume contraction from the casting temperature to the final solid casting, the low ductility and strength values of cast steel just below solidification temperature, the non-uniformity of sections of castings and the great difference in the solubility of gas in the liquid and solid states. Directional solidification will, of course, overcome some of these problems inasmuch as there are then no regions wherein stresses are applied to thin sections lying between heavier, more slowly, solidifying sections. Also, by ensuring that there is an adequate volume of steel for feeding which can reach the appropriate regions, contraction cavities can be overcome. Since correct union of the insert with the casting is often necessary, it is proposed to consider inserts of thin sections first, such as chaplets.

CHAPLETS

Naturally the prime requisite of chaplets is that they should support cores, but they should only be used if core prints will not do the work satisfactorily or if core prints cannot be employed. The reason is that they are metallic inserts and so can introduce defects into the casting, especially as they extend from one cast surface to another. It is generally a good rule that chaplets are not to be used if it is possible to do the job without them, whilst when they must be used, only the minimum number necessary to ensure satisfactory supporting of the core when surrounded by molten steel should be employed. Factors which have to be studied when chaplets are under consideration are: Composition of the chaplet and of the casting; time of positioning of the chaplets in the mould; adequate supporting of the cores when they are surrounded by molten steel; avoiding interference with the flow

* Presented at the annual conference of the Institute of British Foundrymen in Cardiff, last June.

of molten steel; coating to assist fusion with the casting; maintaining pressure-tightness, and avoiding blowholes and other defects.

Composition

The first point in the above list, namely, chaplet composition, is one that is easily overlooked. Since chaplets become part of the casting, it is essential to ascertain whether the ordinary low-carbon steel chaplet that is normally used will be suitable for an alloy casting. Granted that normally the chaplet will not even be detected in the casting, there may be cases where thick-stemmed chaplets may be used and this, associated with other factors, can prevent fusion with the casting. It is only in rare cases that this feature causes any trouble, and for the most part it can be ignored.

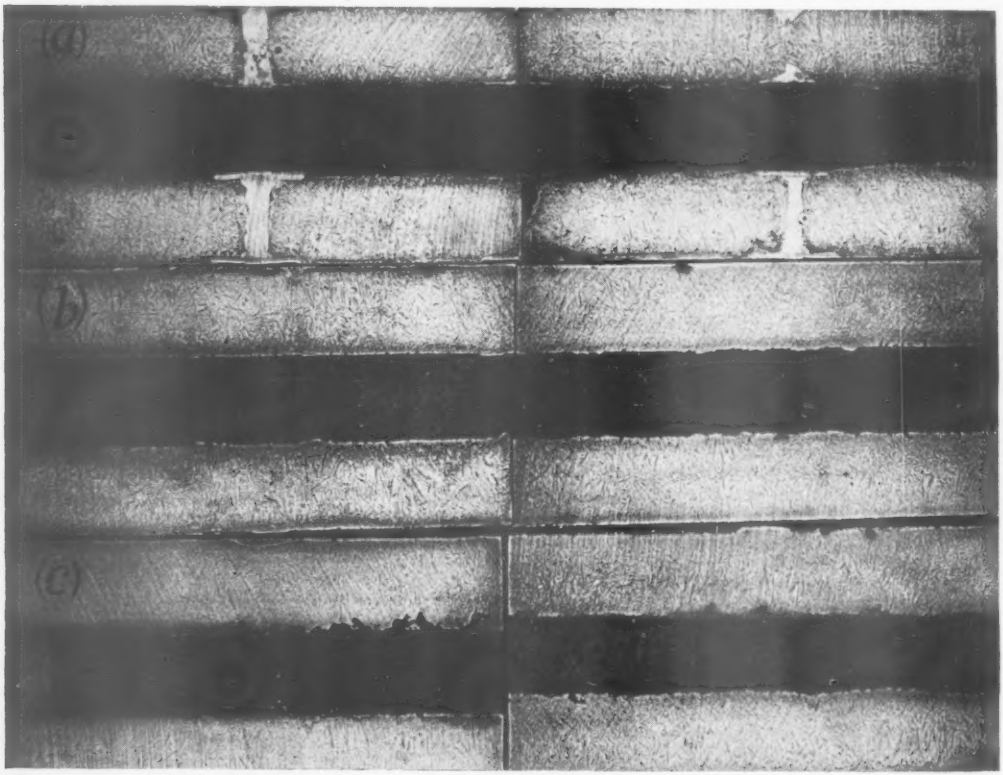
Positioning

The time of positioning of the chaplet in the mould needs to be given some thought on account of the possibility of forming an undesirable coating on it in the mould. Although the statement is sometimes made that in dry-sand work, fumes from organic bonds in the moulding sands will leave a deposit on chills and chaplets if these have to be inserted prior to baking, in practice this will rarely affect the use of chaplets in this class of work. Since the pre-baked cores are inserted after the mould has been baked, chaplets for supporting those cores can also be positioned at that time. What may prove to be very detrimental is the condensation of moisture on chaplets in green-sand moulding, resulting in defects in the casting. This also infers that storage of chaplets must be done carefully to prevent any possibility of rusting occurring.

Core Support

When considering the provision of adequate core support, several items require attention. The chaplet head should be relatively large to avoid the possibility of it being forced into the sand mould or core; the stem of the chaplet should be of such a size that it will support the weight of the core even when surrounded by molten steel, but it must, at the same time, fuse into the liquid steel. The number of designs of chaplet is legion, and one feature that has led to some experimentation is the chaplet stem. The object has been to get

FIG. 1.—*Longitudinal sections of castings in which the cores were supported by chaplets. Macro-etched; (approx. ½ size). (a) roller chaplets, (b) cylinder chaplets, and (c) sheet-metal chaplets.*



rapid fusion of the surface layers, but making use of a stem of sufficient thickness that this action gives out so that adequate support of the core is obtained at all times; thus, there are the screw-thread, twisted, and other distorted-stem types. However, it has been found that re-entrant angles or corners should be absent as pockets of gases may be trapped therein, whilst the screw-thread and similar forms are not considered to be of such great value in aiding fusion. Square section, twisted stems are regarded by many people as being the most satisfactory form of double-head chaplets as regards fusion with the casting. Besides these double-headed chaplets, several sheet-metal types are in general use, often of perforated metal; being of thin section they fuse readily, and also, for little weight, large bearing surfaces are obtained. Shell or top-hat chaplets are widely used since, though of thin section, they have great strength.

Metal-flow Requirements

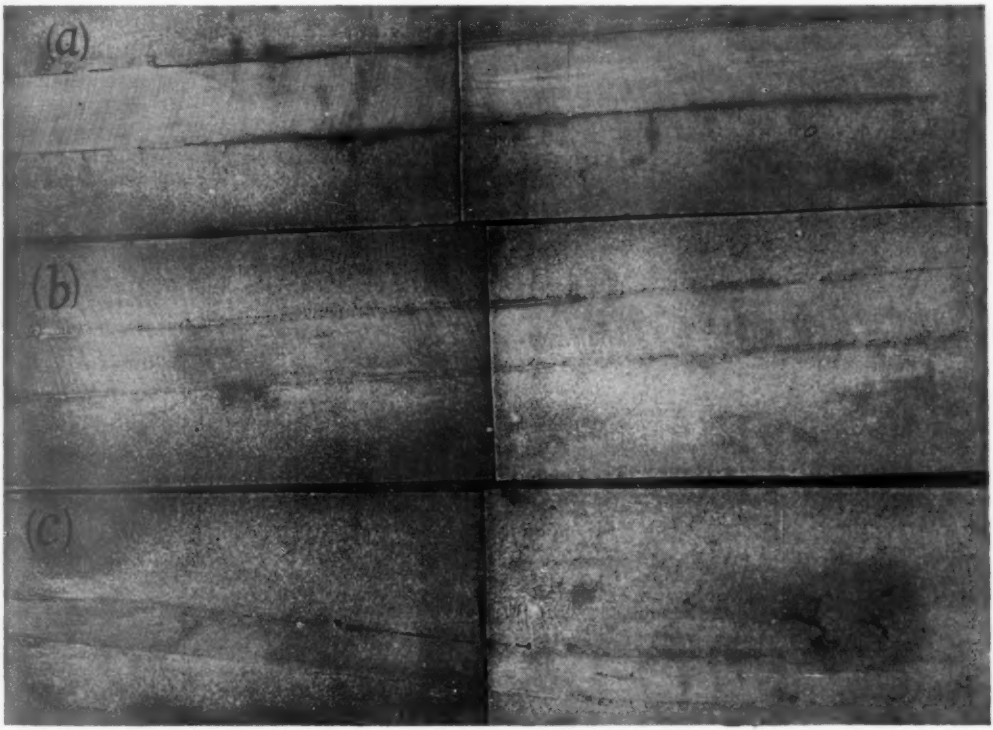
Chaplets are usually of low-carbon steel which can be readily made into suitable shapes and they are frequently given some kind of coating. It is often found that, in practice, chaplets with stems heavier than necessary are employed, and a more than sufficient number is frequently used, to give an unduly-large margin of safety as regards core support, without taking into account the fact that defects may be introduced. Dealing with the positioning of the chaplets in relation to the flow of molten metal along the mould, it is clear that troubles can arise. The force of the molten steel can cause the chaplet to be displaced and so result in misalignment of cores, and also the effect of impingement and continual passage of molten steel past the chaplets can cause their premature melting and floating of the cores. In addition, if the sheet-metal variety of chaplet is used, haphazard positioning can result in gas pockets being formed.

Too early fusion can lead to floating of cores, and can be contributed to by the use of a low melting-point material, a very thin chaplet stem, or the passage of much molten steel past the chaplet as the mould is being filled. The melting point of the chaplet is generally sufficiently high, though some alloy and impregnated chaplets have been found to give early fusion.

Coatings

The question of different coatings was investigated by Taylor and Rominski, both as regards the effect of the coating on fusion and on the surface

FIG. 2.—*Macrostructures of castings with square inserts.* (*a*) 1-*in. sq.*, (*b*) ¾-*in. sq., and* (*c*) ½-*in. sq.*; (*approx.* ½ *size*).



preparation necessary to receive these coatings. Naturally, rust should not be present on the surface of the chaplet when the mould is closed, and when stored under the usual foundry conditions, rusting of non-coated ones may easily occur. Rust-covered chaplets will not take coatings satisfactorily and if coatings are to be applied, prior shot-blasting may be advisable. Among various coatings investigated were tin, nickel, copper, silver, cadmium, aluminium, and silicon-impregnated chaplets. The tin-dipped chaplets gave inconsistent results, whilst silver-cadmium and cadmium coatings proved unsatisfactory, on account of the high vapour-pressure of cadmium. Nickel and copper-plated specimens were satisfactory and silver-plated chaplets consistently proved very good. Promising indications were obtained from aluminium coatings, but conclusive evidence could not be put forward. Zinc, or alloys containing zinc, are unsatisfactory for coatings, and will cause internal cavities.

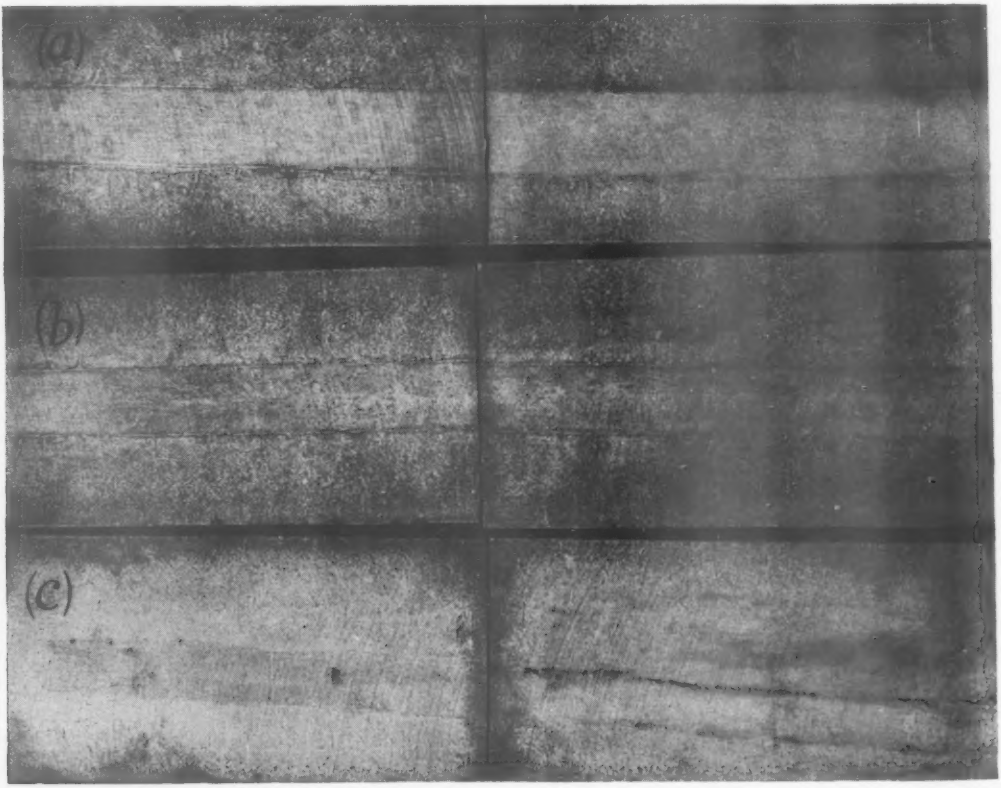
Possible Defects

Since chaplets extend from one cast surface to another, lack of fusion with the casting assumes great importance when considering pressure tightness. If there is any possibility that, under hydrostatic pressure, leakage along unfused chaplet stems may occur, it is possible to chip out the chaplet head and reweld the section. Blowholes adjacent to chaplets are usually associated with lack of fusion, resulting probably from damp or rusty surfaces and so perfectly clean surfaces are necessary, whether they be coated or not, whilst, as mentioned earlier, the correct type of coating must be used, or else clean, bright-steel chaplets may be used uncoated.

Experimental Data

As a short experiment to indicate fusion possibilities of chaplets, three test-bars were cast, 3-in. square by 12-in. long, with a 1-in. cored hole down the centre, the core being positioned by means of six chaplets in each, spaced equidistant along either side of the core. These bars were cast from low-carbon steel (C. 0.23, Si. 0.26, and Mn. 0.66 per cent.) and were cast vertically. In the first case, a heavy-section chaplet of approximately ¼-in. dia.

FIG. 3.—*Macrostructures of castings with round inserts.* (*a*) 1-*in. dia.*, (*b*) ¾-*in. dia., and* (*c*) ½-*in. dia.*; (*approx.* ½ *size*).



gimped stem, of non-coated steel was the type used; secondly, another double-headed type was used, the stem being $\frac{7}{64}$-in. dia., with a coating of tin with some copper, and thirdly, a sheet-metal top-hat type was employed, approximately 0.015-in. thick—similarly coated. The bars were carefully sectioned lengthwise, and macro-etched, the results being shown in Fig. 1. Bar (*a*) shows that though one of the chaplets fused completely across the middle of the stem, the remainder stand out clearly. Both the other two types of chaplet have fused almost completely into the casting, a portion of one of the sheet-metal type being evident at the extreme outside of the cast block.

A micro-section through one of the thick roller chaplets showed that though the chaplet was evident in the macro-etched section (since it had an as-rolled stem), it was completely fused in with the casting. In view of the work on internal chills described later in this Paper, this fusion is, from the point of view of stem thickness, to be expected, but what should be remembered is that this is an uncoated, steel chaplet given no special preparation whatsoever, and so there was a great possibility that defects would be introduced.

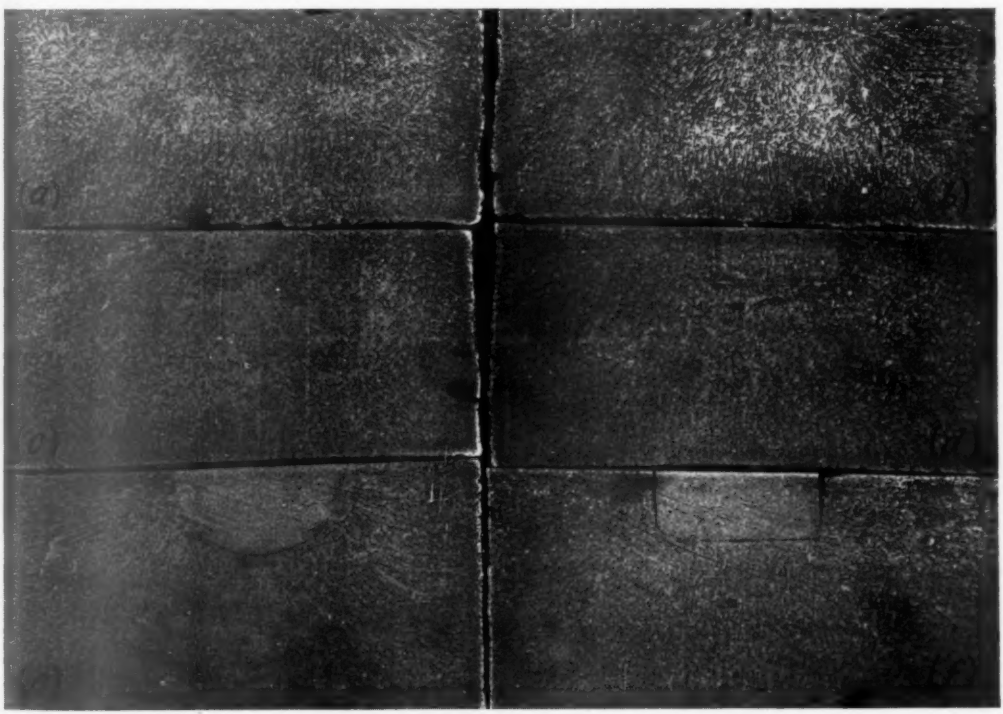
INTERNAL CHILLS

The cross-sectional area of a chill compared with that of a casting has to be borne in mind, since chills may vary from thin-section coils and nails to bars of relatively great section. The types of internal chill in general use are numerous, comprising various chill-nails, spiral coils and bars or blocks. The inserts must be of similar material to that being cast since they become part of the casting and so the thermal-conductivity factor is fixed for a particular material, as compared with external chills where it is possible to vary the factor quite considerably.

Although internal chills are introduced in order to encourage progressive solidification and, by controlling temperature gradients, to eliminate undesirable hot-spots, thus giving freedom from shrinkage defects, it is possible to over-chill and prevent fusion with the parent casting. It must be remembered that an insert performs its duties in two ways: First, it displaces an equal volume of molten steel so that less heat is being introduced into the mould; the fact there is a smaller liquid volume also means, of course, that the amount of liquid shrinkage is reduced. Second, the insert itself absorbs heat, particularly as it approaches fusion point.

Some internal chills take the form of thin, helical coils and others are of nail form, and consequently there is a limit to the amount of heat which any particular chill may extract. Thus, the

FIG. 4.—*Macrostructures of transverse slices of castings containing internal chills; (full size).*



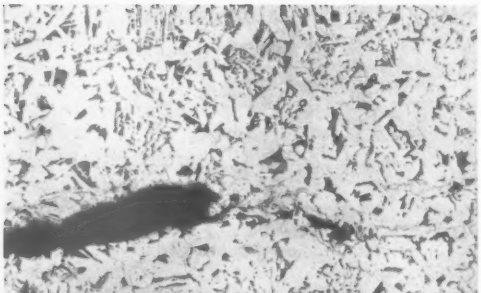


FIG. 5.—*Microstructure showing the junction of the 1-in. sq. chill and the casting; magn.* × 40; (*transverse section*).

chill should ideally be extracting heat from a fixed volume of metal and not from constantly-changing metal as would be the case if the molten steel were continually flowing past a particular chill causing it to reach its own limit as regards heat extraction quickly. This is also greatly influenced by the degree of superheat of the cast metal. On the other hand, if an external chill of very heavy section relative to the particular part of the casting is employed, the molten steel immediately adjacent to the chill may be cooled to such an extent that subsequent thermal-diffusion may still not be sufficient to allow of fusion of the insert with the casting.

There are instances where fusion with the parent casting is not essential. Internal chills may be used in bosses and raised pads that have to be drilled, these parts being potential hot-spots, and though of greater section than the surrounding regions, are often not considered worthwhile to feed by means of heads. In such cases, the use of a chill of smaller diameter than the hole to be drilled, results in the earlier solidification of the boss. Fusion with the casting is not necessary, but it is important that other defects are not introduced.

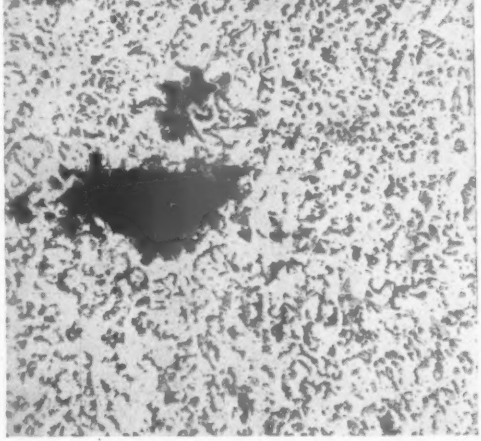
Recommended Shapes

The shape of the chill has to be considered, since corner effects may be introduced. Corners may pick up heat very rapidly from the surrounding steel and, by local melting, can result in blowholes in the adjacent metal due to gas occluded by the chill. However, the rate of heat pick-up may be just sufficient to cause fusion with no other deleterious effects. Unfortunately, the remainder of the chill, such as the plane surfaces of a square or rectangular chill, will often be found to be unfused. Still considering the shape factor, coil chills are employed for mild, internal chilling. In this design, it is intended that excellent keying will occur and fusion result. Because of low mass to surface area ratio, the amount of chilling is not great, and so fusion should be satisfactory. However, dirt and gas entrapment can easily occur, this over-riding the benefits to be derived from moderate chilling.

Of the various nail chills, the least satisfactory are those with large, flat heads, not so much from the point of view of chilling as from the introduction of defects into the casting. Cavities may be formed, either above the head or at the junction of the head and stem where the re-entrant angle allows the entrapment of gas pockets.

This factor of the shape of the insert is, as already mentioned, important in connection with blows and entrapped gases. It is considered that if horizontal surfaces can be avoided, much of this trouble vanishes. It is suggested that if nails be used, points uppermost, or chills of square section with a pyramid top be placed with the longitudinal axis in the horizontal or vertical plane, there will be no horizontal faces and so there will not be trouble from entrapped gases. Added to these defects is the point that internal chills can result in considerable stresses being set up, and so cracks can occur which, if very fine and transverse to the insert, can easily be missed when radiographed, even though they may extend well into the casting.

FIG. 6.—*Microstructure at junction of ½-in. sq. insert and the casting; magn.* × 40; (*transverse section*).



Coatings

The remarks which have been said concerning chaplets apply to the coatings for chills also, particular care being given to deposition resulting from the burning off of organic bonds from moulding sands, since internal chills are often difficult to insert in baked sand and so may be positioned whilst in the green state. Generally, only the smaller inserts are coated, shot blasting immediately prior to insertion being regarded as sufficient for the larger ones.

Experimental Data

The following experiment was designed to provide some information on the fusion characteristics of some chills, the effect on elimination of shrinkage being ignored. A series of test-blocks were made in plain, carbon steel of the following composition:—C 0·14 and Mn 0·35 per cent. The test-blocks were 3-in. sq. by 12-in. long, cast vertically, with inserts of mild steel of sizes varying from ¼-in. dia. up to 1-in. sq. being positioned along the longitudinal axis. These internal chills form the following proportions of the cast-bar by volume.

	Per cent.		Per cent.
1 in. sq.	11.11	1 in. dia.	8.73
½ in. sq.	6.25	¾ in. dia.	4.91
¼ in. sq.	2.78	½ in. dia.	2.15

The moulds were dried and then, just prior to casting the test blocks, the newly shot-blasted inserts were positioned. The blocks were radiographed to indicate, besides possible defects, whether there had been any movement of the chills so that due allowance could be made when sectioning for subsequent examination. The blocks were then sectioned longitudinally, and transverse slices taken from half way along each bar. Magnetic crack-detection enabled the course of each insert to be followed, together with the attendant cracks which occurred in certain cases. Because of slight misalignment and warpage of some of the inserts, sectioning along the mould junction did not always cut exactly through the centre of the chills. Reference to Figs. 2 and 3, which show the macro-structures, approximately half-size, of these test-blocks will indicate the presence of long, fairly-fine cracks which emanate from the 1-in. square insert, and the blowholes adjacent to the ½-in. insert, especially in the upper half, two very severe groups being evident in the case of the ½-in. sq. section. The ¾-in. section inserts seem the most satisfactory of this series, since although the junction line is evident, there does not seem to be much in the way of associated defects.

Structures Produced

Further in this investigation, the transverse slices were macro-etched, the structures being shown in Fig. 4. As shown by the macro-structures, the larger inserts have had pronounced chilling effects, and the junction line between insert and casting is quite pronounced. The 1-in. sq. section chill shows what may happen at a corner, where fusion and rounding-off have occurred. The ½-in. section

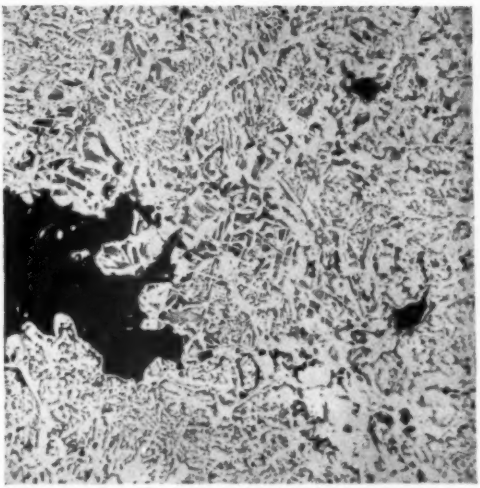


FIG. 7.—*Microstructure at junction of ½-in. dia. insert and the casting; magn.* × 40; (*transverse section*).

chills appear to have fused well, the junction however being traceable by means of the associated cavities, indicating the dangers of too rapid fusion, especially when one considers that the larger proportion of the defects occur in the upper half of these blocks and not at the centre line. The ¾-in. bars represent the ideal size in this instance, particularly the ¾-in. dia. bar, *i.e.* approx. 5 per cent. by volume, the junction being just detectable, and have no associated defects such as cracks or blowholes. Micro-structures of representative sections are shown in Figs. 5, 6, and 7, the former showing the junction of the 1-in. sq. chill and the casting, the next being the structure of the ½-in. sq. chill and the third that of the junction between the ½-in. dia. insert and the casting, all these sections being taken from transverse slices cut through the mid-length position of the castings, where the defects are not very greatly pronounced compared with the upper halves.

In Fig. 5, a field has been selected to show a region where the chill has fused in with the casting and an adjacent gas cavity, the field being taken at a position representing the melted corner of the chill. Fig. 6 shows a defect associated with the ½-in. sq. chill, the remainder of this microsection showing complete fusion. The ½-in. dia. chill could be traced by means of cavities adjacent to the insert, Fig. 7 being selected to show a mixture of fused and blown regions.

Conclusions

The general deductions to be made from this review of the use of chills and chaplets in steel casting are that:—

(1) Cleanliness of any kind of insert is essential if defects are not to be introduced into the cast-

ing; this involves careful storage of chaplets and prior preparation of chill surfaces.

(2) The minimum permissible number of chaplets should be used, to avoid introducing defects.

(3) There appears to be an optimum size of internal chill compared with the section of the casting, so as to avoid stress concentration leading to cracks and to prevent too-rapid fusion and possible blowhole formations.

(4) Positioning of chills must be related to the pouring technique so that the insert is not preheated prior to being enclosed by molten steel.

(5) All inserts should be carefully selected so that there are no re-entrant angles or positions where gas pockets can be entrapped.

Thus, it would appear wise to attempt to create progressive solidification and feeding by alternative means, using internal chills only when it is inconvenient or uneconomic to use more orthodox methods.

Acknowledgments

The Author wishes to acknowledge the assistance of his colleagues in carrying out the experimental work and to thank Dr. E. Gregory, director and chief metallurgist of Edgar Allen & Company, Limited, for permission to publish this Paper.

BIBLIOGRAPHY.

Dietert, H. W., "Modern Core Practices and Theories," American Foundrymen's Association, Chicago, 1942; first edition.

Longden, E., "Densening and Chilling in Foundry Work," C. Griffin & Company, Limited, London, 1954; first edition.

McIntyre, J. B., "Metal Casting Methods—Gating and Feeding Practice," *Metallurgia*, November, 1953, **48**, 241-246.

Taylor, H. F., and Rominski, E. A., "Chaplets and the Steel Casting," *Trans.* Am. Foundrymen's Assoc., **48**, 481-517.

Briggs, C. W., "Metallurgy of Steel Castings," McGraw-Hill Book Company, Inc., New York and London, 1946; first edition.

Modification of Si/Al Alloys

Patent No. 712,900 granted to the Harborough Construction Company, Limited, and Mr. Alfred Augstein, includes the following claims:—

1. A process of effecting modification of aluminium alloys containing silicon, by means of metallic sodium and/or equivalent metal, during degassing as hereinbefore defined of such alloys by means of a halogen degassing agent, more particularly chlorine and/or a substance capable of liberating chlorine and/or fluorine in the melt.

2. A process according to Claim 1, wherein the degassing and modifying agents are caused to operate together as required, by simultaneous addition thereof to the melt.

3. A process according to Claim 2, wherein a degassing agent consisting of a substance capable of liberating chlorine and/or fluorine in the melt is associated with the modifying agent in the form of a package for combined addition.

4. A package for effecting combined degassing and modification of aluminium alloys containing silicon, wherein a degassing agent consisting of a substance capable of liberating chlorine and/or fluorine in the melt and a modifying agent consisting of metallic sodium and/or equivalent metal are sealed, separated from one another, in an envelope or container made from a substance with which they do not react and which is air and water proof.

5. Aluminium alloys containing silicon when treated by the process according to any of Claims 1 to 3.

Rail Freight Scheme Confirmed

Confirmation has been given by the Transport Tribunal of the British Transport Commission's railway freight charges scheme, but with some alterations. The scheme, as submitted by the railways, proposed that maximum charges should be fixed for the carriage of all goods carried by merchandise train.

The tribunal has decided that the commission should be allowed to fix maximum charges for the carriage of all goods by freight train, except goods carried in owners' tank wagons, owners' wagons, or road-rail tank wagons, and any consignment weighing 100 tons or more. As amended by the tribunal, the scheme authorizes the commission to fix maximum charges for some goods traffic, and in the case of the exceptions, which represent a fair proportion in terms of tonnage, to make such charges as may be reasonable.

Fabricating and Casting Magnesium

To obtain technical information on present practice in fabricating and casting magnesium in the United States, Technical Assistance Mission (No. 104) of the Organization for European Economic Co-operation, was dispatched to investigate, and its report has been recently published. The Mission which visited 10 plants included members from Austria, France, Germany, Italy, and the United Kingdom. While the mission found no fundamental difference between the general techniques applied in the United States and those in Europe, the scale on which American factories operate allows the application of methods which are highly productive as regards both quantity and quality.

Emphasis is laid on the constant striving after quality, an attitude, it is considered, essential to an industry dealing with a metal that does not lend itself to empirical methods. However, the report says that with few exceptions, the state of the market for processed magnesium alloys in Europe excludes the possibility of a too precipitate introduction of American ideas, at least for the time being; but many processes and practices, generally relating to points of detail, but nevertheless representing a definite step forward, could very easily be adapted to European workshops.

GTMA Activities

Membership of the Gauge and Tool Makers' Association is now 330 British firms wholly or primarily concerned with the manufacture of precision tools and gauges, moulds and dies, diamond tools, special purpose machines, etc. With the object of providing guidance and assistance for member-firms not already operating pension arrangements of their own, the Association has prepared and issued a series of specimen pension schemes covering (*a*) works employees, (*b*) works and administrative staff and non-controlling directors, (*c*) senior staff and non-controlling directors. Included is a specimen life assurance scheme and providing death benefit only in the event of an employee dying while in his employer's service.

The Lord Mayor of Coventry has accepted an invitation to attend the luncheon which the association is giving to Sir Alfred Herbert on September 4 at the Hotel Leofric, Coventry, to mark the occasion of Sir Alfred's 90th birthday on the following day.

Equipment and Supplies

Pyrometers

Ether Limited, Tyburn Road, Erdington, Birmingham 24, announce the development of the Transitrol model of indicating temperature-controller. This is a self-contained direct-deflection instrument for indicating and controlling temperature to close accuracy over a wide range. It can also be applied to any process where the signal can be converted into a direct current or voltage. The new instrument incorporates a conventional pointer galvanometer as the measuring and indicating system, temperature control being effected by the pointer itself which operates a simple photo-electric system, the latter being coupled to control the heating system. Calibrations are available for use with various types of thermo-couples or other temperature-sensing media.

The control arm, which is pivoted within the case so as to move on the same radius as the pointer, can be adjusted externally to the set temperature required. It is fitted with a photo-sensitive transistor, optical lens and low-level light source. Starting from cold, when the transistor receives full illumination, a relay is energized to bring the heating medium into operation. With increasing temperature, the galvanometer pointer reaches the set position of the control mechanism, whereupon a flag carried on the pointer obscures the light source and the heating is cut off. It is claimed that the whole set-up permits the excessive use of a fine degree of regulation of operating temperature. The net weight of the instrument is 10½ lb. and it is available for wall or panel mounting.

Impregnation Sealing

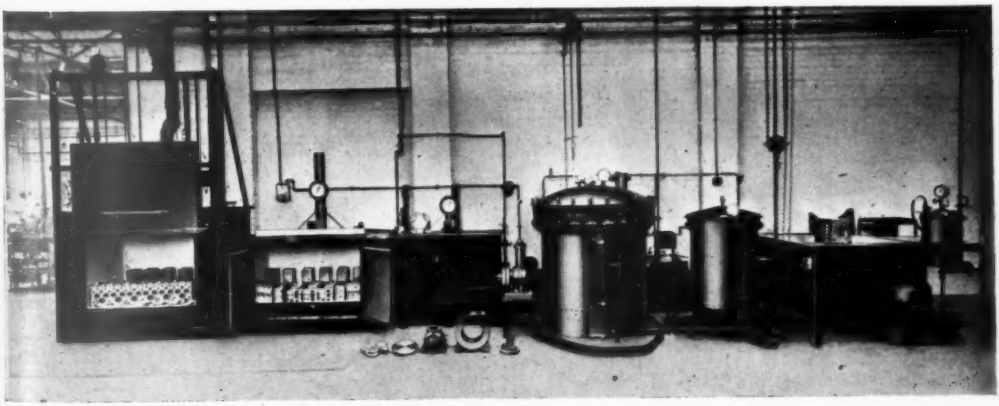
Pulsometer Engineering Company, Limited, Reading, Berkshire, have taken up the process of impregnation by plastics for the sealing of porous material, which has been successfully applied to bronze, gunmetal, steel, iron and aluminium castings of all sizes. Some of the components treated have included highly finished, intricate engine-castings costing hundreds of pounds. Typical examples are suction and delivery covers of pumps weighing over half-a-ton each and standing up to pressure of 1,200 lb. per sq. in. after impregnation. The company is both offering for sale equipment for carrying out the process and organizing an impregnation service at its Reading factory.

It is interesting to note that the process was originally conceived as an expedient in the firm's works for the salvage of castings which were shown to be porous under pressure tests. During the war years especially, when speed as well as efficiency was essential, many man/hours were saved by this method. In response to outside demands, the company has now perfected its own special vacuum process of impregnation and extended it to cover castings sent in by outside firms. Throughout the engineering industry, opinion is becoming reconciled to the view that if faulty castings can be reclaimed in this way, valuable time is saved, and the workmanship, skill and research which have gone into otherwise finished and expensive items can be turned to good account. The Pulsometer concern can now process castings at its own factory (at Nine Elms Iron Works, Reading) or where this is impracticable—as in the case of overseas firms—they are prepared to process sample castings at their works prior to quoting for the installation of the necessary plant (Fig. 1).

Vacu-Blast Gun

A new form of Vacu-Blast gun has recently been introduced by Vacu-Blast, Limited, 291, Aberdeen Avenue, Slough (Bucks). Essentially, the system (described in the JOURNAL, February 24, 1955, p. 208) consists of introducing chilled shot down the centre of a cone, the periphery of which carries nylon bristles to seal the cone in contact with the work-piece, from outside air. The shot, dust and scale is, by vacuum, sucked back through an orifice situated near the top of the cone. The new gun, known as the High Production gun, is used with the firm's senior machine. It is in effect a small shotblast cabinet in which is fitted a rotating nozzle assembly consisting of three ¼-in. blast nozzles. An 8-in. wide blast-cleaned path is obtained with each pass of the projector, and millscale can be completely removed at a rate varying between 300 and 600 sq. ft. per hr., depending upon the surface to be cleaned. Smaller models of this type of shot-blast gun have been found useful for giving added treatment to shotblasted castings requiring to be extra clean, as in bath manufacture prior to enamelling, and for certain aspects of motor-car work.

FIG. 1.—*Arrangement of the plant developed by Pulsometer Engineering Company, Limited, for the vacuum-impregnation sealing of porous castings.*



New Patents

(Copies of complete specifications are obtainable from the Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s.)

750,979. R. W. Taccone, 28, Chautauqua Boulevard, Erie, Penns., USA.

A machine for packing sand into a moulding box around a pattern. It comprises a support for a mould box and a head located above the support in such a way that, when the box is placed on the support, there is a gap between the top edge of the mould box and the bottom edge of the head. The head and the mould box are immovable vertically relative to each other. The head carries a flexible diaphragm which can be drawn upwardly into the head to make room for sliding a mould box on to the support, and which can be expanded to compress the sand in the box.

750,980. R. W. Taccone, 28, Chautauqua Boulevard, Erie, Penns., USA.

A foundry moulding-machine has a flexible obtruder for pushing sand around patterns, means for inflating the obtruder to push the sand, and further means of deflating the obtruder. It is then drawn up out of the way of the flask or mould box.

751,065. Ford Motor Company, Limited, 88, Regent Street, London, W.1.

A process for producing a perforated shell-moulded gate plate from a resin/sand mixture. A perforated plate pattern is heated, and a sand/resin mixture heaped on it. The plate pattern is then moved under a strike-off bar spaced from the heated plate pattern a distance slightly greater than the thickness of the plate pattern. The struck-off plate is cured by heat, the upper portion of the plate pattern being planar except for the perforations which correspond to the perforations in the gate plate.

751,113. Dow Chemical Company, Midland, Michigan, USA.

A method of making a titanium alloy and a solid element alloyable therewith. Magnesium in particulate form is mixed with the alloying element also in particulate form. The mixture is then supported on an atmosphere of titanium tetrachloride vapour, the temperature being maintained at 708 to 950 deg. C. The magnesium is thus permitted to burn only at a smouldering rate whereby titanium sponge is formed. The titanium sponge is removed from the titanium tetrachloride atmosphere, melted, then allowed to solidify.

751,226. Kokichi Otani, 28, Gazenbo-cho Azabu, Minato-ku, Tokyo, Japan.

A method of making metal castings. Molten metal is first poured upwardly from the lower-neck sand-mould of a mould which comprises a body portion mould connected between an upper-neck sand-mould and a lower-neck sand-mould. The metal is allowed to stand until the outer part of the metal in the body portion of the mould has solidified to the desired thickness. At least one drainage outlet (independent of the inlet through which the metal was first introduced) is pierced at the bottom part of the mould. The still molten metal in the mould is then drained away, whilst a second molten metal is poured downwardly from the top of the upper-neck sand-mould so as to replace the metal being drained away.

Book Review

Ryland's Directory, 32nd Edition. Published by Industrial Newspapers, Limited, John Adam House, 17-19, John Adam Street, London, W.C.2; price four guineas (bound in cloth) and five guineas (bound in leather).

In this new edition, foundry information has been assembled in section 5 running to about 80 pages. It starts off with a country by county list of iron, steel, and non-ferrous foundries; these are listed again in the alphabetical section wherein a good appreciation of the general set-up of a company can be had. Following "ironfounders," the specialist foundries are listed. No separate list of those making shell-moulded castings is given, as far too many are still in the development stage. The list is further expanded at the end of this sub-section by setting out all the various specialities made by foundries. Then follows a section devoted to foundry plant and equipment. In this section, there is in this edition a very lengthy list of patternmakers, thus registering a real improvement. It is interesting to find that whilst lycopodium is mentioned, one has to turn to another section "Engineering Specialities" for suppliers. There, but two names well known amongst foundry suppliers are given, so it must be supposed that it is used by other industries. It was extensively used as a parting powder before the 1914 war, but as it mainly came from Russia, supply became difficult and founders turned to substitutes.

The reviewer has only dealt with less than one twentieth of the total contents—those of primary concern to the foundry buyer. The balance is of more interest to the seller. For instance, if a foundry is selling castings for a particular purpose, lists of makers of such plant may indicate room for expansion. Again, the geographical section is useful to a traveller visiting some small town, as it may enable him to call on several useful concerns in addition to the one with which he is already familiar. As a buyers' and sellers' guide, Ryland's is, as it always was, invaluable.

Publications Received

ASTM Standards on Light Metals and Alloys. Published by the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa., USA; price $3.50.

In this book, running to about 160 pages, is assembled a quantity of specifications covering light alloys, both as-cast and wrought. The major specification for sand-cast aluminium alloys is numbered B 26-55T. It covers no fewer than 20 alloys and as the majority of the acceptance clauses apply to all types of castings, there is a distinct saving of paper, at the expense of the insertion of numerous footnotes, yet such action is worthwhile. Included are specifications for both magnesium and aluminium as sand, gravity- and pressure-die-castings. By and large, the specifications follow much the same lines as their British counterparts.

Weldability of High-tensile Structural Steels. Published by the British Welding Research Association, 29, Park Crescent, London, W.1; price £1.

The work described in this Report includes the examination of existing weldability tests, the concept of critical cooling rate, the development of the controlled, thermal severity test, and the correlation between weldability and end-of-transformation temperature as determined by continuous cooling dilatation tests.

Company Meeting

THE WOLVERHAMPTON METAL COMPANY

A Record Year's Trading

MR. THOMAS C. JAMES ON MATERIALS SUPPLY PROBLEM

The 53rd annual general meeting of The Wolverhampton Metal Company, Limited, was held on August 3 in Birmingham, MR. THOMAS C. JAMES (chairman and joint managing director) presiding. The following is an extract from his circulated statement:

The year ended March 31, 1956, has been the most successful in the history of your company. The group profit (before taxation) amounts to £610,479, as compared with the previous year's figure of £432,122. The group's trading and manufacturing operations have benefited from a number of factors, foremost among these being the continuation of a policy which aims at stability in all our trading. Our turnover has increased by over 40 per cent., largely due to the phenomenal increase in the price of copper; our output of finished material also showed a small tonnage increase.

The expenditure of over £350,000 during the last three years on modernization and new plant has enabled us to process through a series of ancillary operations a more complex range of materials with copper content as low even as 4 per cent. in some cases, hitherto uneconomic to treat. This has enabled us to augment our normal intake of materials which have been and still are in short supply.

During the year, the already high price of copper, £364 per ton at the outset, was further inflated to an all-time high and totally unexpected record figure of £437, easing to £397 when our year ended last March. Some benefit naturally resulted from this increase in price.

Our subsidiary companies made satisfactory contributions to our group results. At the commencement of the financial year our Gloucester branch was established as a subsidiary company in the name of Hayes Metals (Gloucester), Limited.

Our programme of capital expenditure continued during the year, largely on plant and machinery. The commitments of £30,000 noted on the balance-sheet represent a small part only of the scheme of technical modernization aimed at increasing still further our efficiency and flexibility.

Net current assets increased by £278,644 from £840,023 to £1,118,667. Stocks were adequately covered by forward sales and operations on the London Metal Exchange.

The "Credit Squeeze" which presented many problems has been satisfactorily surmounted since the year end by stock reductions and careful attention to credit control. These measures have now given us a cash position adequate to meet our capital development programme.

There was a record group profit as stated of £610,479, of which £309.032 has been set aside for taxation. By way of final dividend the board has recommended the payment to stock-holders of 17½ per cent., making a total distribution for the year, subject to income tax, of 27½ per cent., as compared with an equivalent of 23⅓ per cent. for the previous year.

Future Outlook

For the first three months of our current year we have been fully occupied and our order-book is satisfactory. The problem of materials supply is still with us. To this end we are just bringing into production a large unit for treating complex copper-zinc residues which in the past have mainly gone abroad.

In the national interest and in the interests of the non-ferrous industry as a whole, we are sorry to note the increasing efforts of some metal merchants to obtain licences for the export of vital copper-bearing scraps and residues which, with British labour, can be converted to finished products. Any diminution of the country's stocks of scraps and residues, already in short supply, can only militate against the vital need to export manufactured products. To support the national policy of full employment it is necessary for the United Kingdom copper refining and smelting capacity to be fully employed.

Given freedom from industrial disturbance and a reasonable level of trade we can look forward to the future with confidence.

The report and accounts were adopted.

Company News

WILMER LEA FOUNDRIES (HOLDINGS), LIMITED—The board announces a 6 per cent. dividend for the year to March 31 last. No dividend was paid for the previous year. The consolidated net profit, before tax, of £33,922 compares with £26,306.

QUALCAST, LIMITED—The credit squeeze and present conditions in the automobile trade are adversely affecting the company, which has reduced its foundry production. In a letter to employees of the group in Great Britain, the chairman, Mr. V. Jobson, states that the company has broken all records, volume, output of finished products, wages paid and profits. He adds, however, that since the letter was written the company has had to cut back foundry production.

GAS PURIFICATION & CHEMICAL COMPANY, LIMITED—The board is recommending a final dividend of 25 per cent. on the capital as increased by a 400 per cent. scrip issue and issues against acquisitions. The present issued one-class capital is £512,912 and an interim of 75 per cent. for 1955-56 was paid on £94,132. For the previous 15 months' period to March 31, 1955, there was a total dividend of 137½ per cent., of which 62½ per cent. was on £70,500 capital and 75 per cent. on £94,132.

BRITISH OXYGEN COMPANY, LIMITED—The board has declared an interim dividend on £17,047,166 ordinary capital of 4 per cent. on account of the year ending September 30, 1956, amounting to £392,085. The previous interim payment was 6 per cent. on £8,117,698 ordinary, amounting to £280,061 net. The share capital was increased by the issue in September, 1955, of 3,247,079 £1 shares for cash and by the 50 per cent. scrip issue this year of 5,682,389 £1 shares. The final dividend of 9 per cent. for the previous period was paid after the rights issue, but before the scrip issue.

GENERAL ELECTRIC COMPANY, LIMITED—The company reports record sales in the year ended March 31 last and total exports also reached a record figure. Profits, however, did not keep in line as rising costs could not be fully recovered. Stockholders are also informed that the results were affected by difficult trading conditions in certain consumer goods following Government measures to curb expenditure. Overseas companies experienced another difficult year owing to keen competition, import restrictions, and local manufacture.

News in Brief

THE Vienna Autumn Trade Fair is to be held from September 9 to 16.

ON AND AFTER August 11, the registered office and London departments of Powell Duffryn, Limited, will be located at the new group headquarters at 8, Tower Street, London, E.C.3 (telephone: MANSION House 4555).

ON WEDNESDAY, OCTOBER 3, Alderman Revis Barber, chairman of Bradford Education Committee, will open a new "Hepolite" Apprentice Training School at the St. John's works of Hepworth & Grandage, Limited, engineers, Bradford.

THE first international conference to be devoted to methods of inter-firm comparison will be held this year at Vienna from September 17-20. Details are available from Mr. H. Ingham, British Institute of Management, 8, Hill Street, London, W.1.

ONE-DAY COURSES for apprentices are to be held at the Birmingham and Industrial Safety Training Centre, Summer Road, Acocks Green, Birmingham, 27, on August 15, 16 and 17. Applications to attend should be made to Mr. W. G. Appleyard, 21, Steelhouse Lane, Birmingham, 4.

THE PRICE of Alkathene (ICI's brand of polythene) and its compounds is reduced by 3d. per lb. from August 1. This, the third price reduction in three years, reflects ICI's policy of passing on to the consumer the benefits of increased production and greater plant efficiency.

A RECORD OUTPUT of 46,110 tons was achieved by the "Seraphim" sinter plant of the Appleby-Frodingham Steel Company, a branch of the United Steel Companies, Limited, during the week ended July 21. This output broke the previous weekly record of 43,270 tons set up in April this year.

THE THIRD and final phase of the Dounreay atomic power station is scheduled to begin on January 1, according to Mr. T. A. Parry, works manager. On that date, he said, they were due to take over and start up large sections of the chemical group, as well as the main administration block and workshops, etc. The remainder of the work would be completed during 1957, he added.

BRITISH LABORATORY WARE ASSOCIATION, LIMITED, 6-7, Queen Street, London, E.C.4, announce that their members discussed in general meeting on July 10 the desirability of holding prices of laboratory apparatus firm for a period in accordance with the policy of the Government that price stability should be maintained, and passed a resolution agreeing to maintain for a period of six months their own existing prices for laboratory apparatus both in the United Kingdom and overseas.

BY ARRANGEMENT with the British Iron and Steel Research Association, the Iron and Steel Institute is organizing an open corrosion meeting to be held at its offices, 4, Grosvenor Gardens, London, S.W.1, on October 12, commencing at 10 a.m. and continuing all day. The chair will be taken by Dr. H. H. Burton, C.B.E., president of the Institute, supported by Dr. J. Pearson, assistant director of the Association. The programme of papers will cover low-alloy steels; wrought iron; austenitic Cr/Ni steels of 18/8/Ti composition; and stress-corrosion cracking of austenitic stainless steels.

H. G. SOMMERFIELD, LIMITED, 8, Camden Road, London, N.W.1, has received through the Swiss Car & Elevator Company, Limited, Zurich, a repeat contract for shotblast plant for the Indian State Railways. The plant will duplicate the installation at the new Integral Coach Factory, Perambur, and will be used for preparing the external surfaces of passenger coaches for protective coatings. These coaches will pass through the blasting chamber on the standard gauge rails, and the roof, sides and chassis will be blasted simultaneously during transit. Delivery is scheduled for May, 1957; the contract price exceeds £18,000.

TURBINE ENGINE and afterburner components made in the Nimonic series of heat-resisting alloys will form the centrepiece of the display of Henry Wiggin & Company, Limited, on stand No. 36 at the Society of British Aircraft Constructors Flying Display, to be held at Farnborough, from September 3 to 9. Some recent developments in the production of internally air-cooled blades by means of extrusion will be illustrated by samples of blading, and examples will be seen of the expanding use of the Nimonic alloys for ring components. Other exhibits will indicate some of the duties performed by Nimoply 75, Inconel, Monel, the Brightray alloys and Nilo alloys in aircraft accessories.

FOR THE GREATER CONVENIENCE of its customers, the Brown & Polson group of companies is to standardize its group operating name. As from August 6, all British operations of the three well-known member-companies of the Brown & Polson group—Corn Products Company, Limited, Feculose Company, Limited, and Farina Dextrin, Limited—will be conducted under the name Brown & Polson, Limited. The users of the starch and glucose products manufactured by the group will be dealing in future with Brown & Polson, Limited (industrial products division). It is emphasized that this is purely an administrative change and personal contacts with customers will remain unchanged.

G. & J. WEIR, LIMITED, the Glasgow engineers, have received an order for a fifth set of sea-water evaporating and distilling equipment to add to the £1,250,000 order they received last February. The original order was for four sextuple-effect plants to produce 8,000 tons of fresh water a day in the island of Aruba, Netherlands Antilles, and it has now been decided by the Executive Council of the Island to increase the capacity of the plant to 10,000 tons a day, bringing the original export order up to nearly £1,500,000. Production is well up to time on the original order, which is due for completion in 1957, and this additional order will follow on the production schedule to ensure the erection of the complete plant as planned.

GEORGE ELLISON, LIMITED, the electric switchgear manufacturers, with their associated companies Tufnol, Limited, and Alfred Ellison, Limited, have instituted a National Service Benefits scheme, under which a sum of money in National Savings Certificates is put aside each month during the period of National Service. The accumulated certificates are handed to the employee upon his return to the company. While everyone who has been with the group for a year or more will benefit, at the basic rate of £1 per month, additional sums will be paid to those who have obtained an Ordinary or Higher National Certificate, or their equivalents. To encourage their employees to make the most of their life in the Forces, those attaining non-commissioned rank or higher will have their monthly credits further increased. It is thought that this scheme will help to cement the good relationships existing throughout this group of companies, while men are absent with H.M. Forces.

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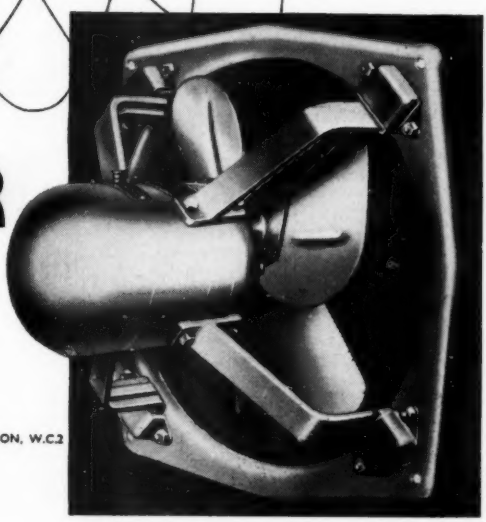

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Personal

Mr. JAMES F. WIDMAN has been appointed to the board of Union Carbide, Limited, Mount Street, London, W.1.

Mr. E. J. WESTNEDGE, general sales manager of British Resin Products, Limited, Piccadilly, London, W.1, has been appointed to the board of the company.

After 40 years with Brown Bayley Steels, Limited, Sheffield, Mr. WILLIAM DEACON has received presentations to mark his retirement. He was formerly machine-shop manager.

Mr. B. R. CANT, general works manager of the National Gas & Oil Engine Company, Limited, has become works director. Mr. J. SMITH, chief engineer, has been appointed technical director.

The retirement is announced of Mr. LESLIE GAMAGE, vice-chairman and joint managing director of the General Electric Company, Limited, from the Council of Industrial Design, on which he has served since its inception in 1945.

Mr. L. REDSHAW, M.ENG., M.I.N.A., M.INST.W., has been appointed an additional member of the board of directors of Vickers-Armstrongs (Shipbuilders), Limited. He will retain his present office of shipbuilding general manager of that company.

Mr. A. G. B. OWEN has joined the executive committee of the Welsh Economic Development Council. He is chairman of the Owen organization—headed by Rubery, Owen & Company, Limited—which has five branches in Wales.

Polygram Casting Company, Limited, Power Road, Gunnersbury, London, W.4, announce that Mr. G. A. SEDGWICK, formerly production manager of Poly-Resin Products, Limited, South Africa, has been appointed to their sales and technical service division.

Mr. G. A. WHIPPLE, chairman and managing director of Hilger & Watts, Limited, has become president of the Scientific Instrument Manufacturers' Association for 1956-57. He was previously a vice-president and has held office in various capacities for many years.

Mr. MAURICE F. C. WILKS, technical director of the Rover Company, Limited, has been appointed joint managing director with Mr. S. B. WILKS. Mr. L. G. T. FARMER, assistant managing director, has been appointed deputy managing director of the company.

The new president of the Sheffield and District Works Sports Association is Mr. H. HUMPHRIES, deputy chairman and managing director of Hadfields, Limited. He succeeds Mr. F. H. BALFOUR, a director of Arthur Balfour & Company, Limited, who has held the office for 10 years.

The sales manager of Tweedales & Smalley (1920), Limited, textile machinery makers, of Castleton (Lancs), Mr. WILFRED WALTON, has retired after more than 51 years with the company. He is 65 and began work with the company as an office boy. He has been sales manager since 1950.

Mr. G. N. F. WINGATE, who has been appointed director and general manager of Distington Engineering Company, Limited, from August 1, has for the last five years been at Steel, Peech & Tozer, Rotherham branch of the United Steel Companies, Limited, where he has been works manager (services).

Mr. E. T. GILL, B.SC., F.I.M., joined the staff of the development and research department of the Mond Nickel Company, Limited, on August 1, as development officer for constructional alloy steels. He has taken up the position which became vacant when Mr. L. W. JOHNSON was appointed assistant manager of the department.

Colonel GILBERT NORTON, chairman and managing director of the Yorkshire Copper Works, Limited, and Mr. ERNEST DUFFIELD, vice-chairman and managing director, relinquished their appointments on August 1. They will, however, continue as members of the board and in the offices of chairman and vice-chairman respectively. Mr. GEORGE P. NORTON, a vice-chairman, and Mr. H. F. SHERBORNE, general manager, have been appointed managing directors of the company.

Mr. F. W. MARTIN has been appointed deputy chairman of Tube Products, Limited, of Oldbury. He has relinquished his appointment as joint managing director of Tube Products, and has been succeeded in this post by Mr. E. D. E. ANDREWES. Mr. Andrewes has accordingly relinquished his joint managing directorship of Accles & Pollock, Limited, of Oldbury, but remains a director of that company.

Sir CHARLES BRUCE GARDNER and other officials of the Iron and Steel Board visited, on July 30, Ashorne Hill, the residential conference centre near Leamington which the Board controls. The purpose of the visit was to make presentations and bid farewell to Colonel and Mrs. J. H. ALEXANDER who, after 17 years as joint managers of Ashorne Hill, are retiring to live near Lake Windermere. Succeeding them is Miss LUCY KEYMER, for the past nine years, secretary at Ashorne Hill.

Mr. J. JACK and Mr. J. H. PATCHETT have been appointed directors of Dorman Long & Company, Limited. Mr. W. S. FLETCHER, managing director of Tees Side Bridge & Engineering Works, Limited, has been appointed a special director of Dorman Long. Mr. Patchett, who has been a special director since 1952, joined Dorman Long as an assistant blastfurnace manager 37 years ago. Mr. Jack is chief accountant of the company, with which he has served for 23 years, becoming a special director four years ago. Mr. Fletcher has been managing director of the Tees Side Bridge & Engineering Works, which is a subsidiary of Dorman Long, for five years.

Obituary

Mr. J. F. MCGLASHAN, who had been chief inspector of William Asquith, Limited, machine-tool makers, of Halifax, since 1939, has died at the age of 60.

Prof. T. B. ABELL, who was Professor of Naval Architecture in the University of Liverpool from 1914 until his retirement in 1940, has died at the age of 76.

The death occurred very suddenly last Monday of Mr. E. HARWOOD BROWN. Though the records of the Institute of British Foundrymen show his membership as dating from 1937, he was quite active in Institute affairs in the 1920's, but left the industry for a period, which accounts for the break. At one time he was assistant to Mr. H. J. Young at North Eastern Marine Engineering Company, Limited. During the last war, he joined one of the service branches of the Government and later was attached to the Ministry of Supply as a liaison officer. He was well known to members of the Institute, as on numerous occasions over many years, he assiduously carried through the office of steward at both national and London branch functions.

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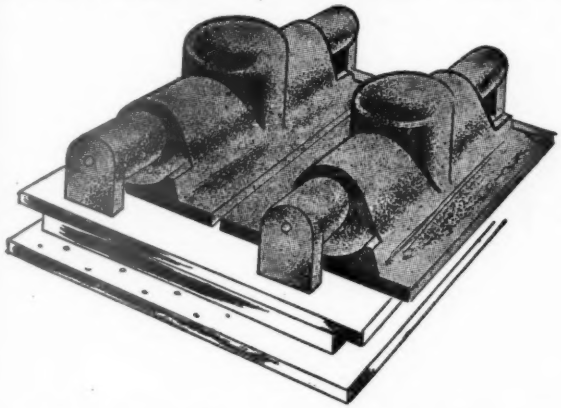

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Raw Material Markets

Iron and Steel

The suspension in deliveries of castings because of the holidays will not present any serious difficulty, as delivery schedules are generally up to date. There is also less eagerness to obtain supplies of pig-iron and scrap; most of the foundries are not accepting deliveries during the closure, as stocks on hand are sufficient for resumption of work after the holidays.

The steel industry is the major consumer of current outputs of pig-iron and it is readily accepting all available supplies of basic iron and a large proportion of hematite iron, the latter being utilized in the melting furnaces as well as in the production of ingot mould castings. The steelworks are also receiving most of the imported iron, which is running at a level of about 38,300 tons a month.

The busiest sections of the foundry trade are the engineering and speciality foundries supplying high-duty castings to the steelworks, collieries, and machine-tool and heavy electrical trades. They are taking up good quantities of low- and medium-phosphorus iron and hematite as well as some quantities of refined grades. They are now receiving better supplies of these irons, owing to the reduced demands from other users, including the foundries associated with the motor-car industry.

Subdued demand continues for the high-phosphoric pig-iron; although outputs are on a reduced scale, available supplies are adequate for current consumption requirements. The engineering foundries using this grade are taking up fair tonnages, but the demand from the light, jobbing, and textile foundries is spasmodic. Consignments of high-phosphoric and refined iron have been shipped overseas on an expanding scale recently.

Stocks of scrap are good in the light and medium grades, but there is a steady demand for heavy cast-iron and machinery scrap. Adequate deliveries of foundry coke are being made and ganister, limestone, and firebricks are received to requirements.

Deliveries of steel semis from home steelworks have kept up to normal levels, but as the re-rollers depend also on imported material some concern is felt on the question of future consignments from overseas, owing to the difficulty in booking supplies. June imports were the lowest this year. The re-rollers are very busy and apart from their existing commitments there is a regular demand for all their output of small bars, light sections, strip, etc.

Non-ferrous Metals

The uncertainty arising from the Suez Canal situation is still affecting non-ferrous metal markets and is likely to persist until the conclusion of the international conference, which begins on Thursday of next week.

The copper market is also labouring under the strain of further labour disturbances on the Rhodesian Copperbelt, the action of United States Custom smelters in raising their price to 39½ cents a pound, and the increase in the Rhodesian Selection Trust "fixed" price by £25 to £300 a ton. Against this background the London market has been firm.

Events in London, however, have not had much impact on the American market, where demand has not yet revived following the settlement of the steel strike. The US supply situation is particularly good and consumers are reported to have more stocks than at any time for the past nine years. Nevertheless, with the current optimistic forecasts concerning the outlook for the US economy in the second half of this year, coupled with the expected revival of the automobile industry on the introduction of the new models, a brisk resumption of demand is awaited.

Tin continues to be a volatile market. The bulk of the tin supplied to the United Kingdom and to the US passes through the canal and fears of a dislocation are a strong bullish factor. Labour unrest in Malaya has quietened somewhat, although the situation is still explosive, and the disturbances in Nigeria are having their effect. Yet buying has not been exceptional in London and even light in New York.

Lead is a good, and at times strong, market on both sides of the Atlantic. The Suez situation is influencing the market, but, even so, demand is steadily improving in the States from battery manufacturers and cable-makers. The price of 16 cents a pound is now considered permanent and purchases for August shipment are being made at the spot price.

Zinc is featureless, but firm. Strikes and holidays in the automobile industry have cut back demand for high grade metal and the ban on overtime in the UK steel industry whittled down orders for g.o.b. zinc. Revival of demand is expected to appear when the US steel mills are back in full operation.

A rise in the price of aluminium appears to be indicated following the dispute between workers and the major producers.

Official metal prices were as follow:—

COPPER, Standard—*Cash*: August 2, £314 10s. to £315; August 3, £318 to £318 10s.; August 7, £325 10s. to £326; August 8, £317 10s. to £318.

Three Months: August 2, £313 10s. to £314; August 3, £317 to £317 10s.; August 7, £324 to £324 10s.; August 8, £316 to £316 10s.

TIN, Standard—*Cash*: August 2, £765 to £767; August 3, £767 to £767 10s.; August 7, £774 to £775; August 8, £774 to £775.

Three Months: August 2, £760 to £762; August 3, £762 to 762 10s.; August 7, £769 to £770; August 8, £770 to £771.

LEAD—*First half August*: August 2, £116 10s. to £117; August 3, £117 5s. to £117 10s.; August 7, £118 5s. to £118 10s.; August 8, £117 10s. to £117 15s.

First half November: August 2, £115 to £115 5s.; August 3, £115 5s. to £115 10s.; August 7, £116 5s. to £116 10s.; August 8, £115 10s. to £115 15s.

ZINC—*First half August*: August 2, £96 to £96 5s.; August 3, £96 5s. to £96 10s.; August 7, £97 10s. to £98; August 8, £96 15s. to £97.

First half November: August 2, £94 15s. to £95; August 3, £95 to £95 5s.; August 7, £96 5s. to £96 10s.; August 8, £95 5s. to £95 10s.

Mr. Noel D. Ridsdale

Owing to an error in printing in the obituary notice of Mr. Noel D. Ridsdale, founder and managing director of Ridsdale & Company, Limited, Middlesbrough, which appeared in our issue of July 26, it was not made clear that he was a founder member and past-president of the Tees-side (formerly Middlesbrough) branch of the Institute of British Foundrymen and a Fellow of the Institution of Metallurgists and of the Royal Institute of Chemistry.

METROPOLITAN - VICKERS ELECTRICAL COMPANY, LIMITED—Mr. W. A. Coates has retired from the board, but he will continue as commercial consultant to the managing director until the end of the year. He has also resigned from the boards of the following Metrovick subsidiaries: Metropolitan-Vickers-GRS, Limited; Newton Victor, Limited; and Sunvic Controls, Limited.

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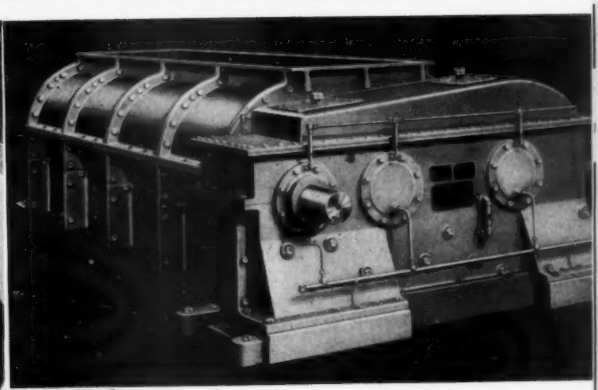

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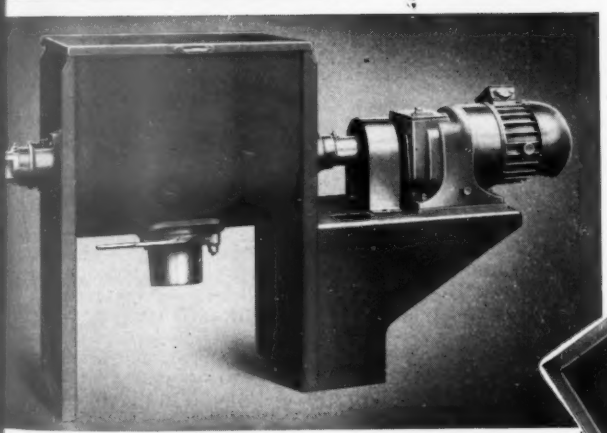

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Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

August 8, 1956

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £17 11s. 0d.; Birmingham, £17 3s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £20 8s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £20 12s. 3d.

Scotch Iron.—No. 3 foundry, £21 14s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £23 16s. 6d.; South Zone, £23 19s. 0d.

Refined Malleable.—P, 0.10 per cent. MAX.—North Zone, £25 4s. 0d.; South Zone, £25 6s. 6d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent. :—N.-E. of England (local iron), £21 7s. 6d.; Scotland (Scotch iron), Zone S. 1, £21 14s. 0d.; Sheffield, £22 14s. 6d.; Birmingham, £23 2s. 0d.; Wales (Welsh iron), £21 7s. 6d.

Basic Pig-iron.—£18 3s. 0d. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £48 0s. 0d. to £50 5s. 0d., scale 16s. 0d. to 17s. 6d. per unit; 75 per cent. Si, £70 0s. 0d. to £73 2s. 6d., scale 16s. 0d. to 17s. 6d. per unit.

Ferro-vanadium.—50/60 per cent., 27s. 6d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 11s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £250 0s. 0d.; 38/40 per cent., £299 0s. 0d.

Ferro-tungsten.—80/85 per cent., 17s. 2d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 20s. 2d. per lb. of W.

Ferro-chrome (6-10 ton lots).—4/6 per cent.C, £93 10s.0d. to £95 0s. 0d., basis 60 per cent. Cr, scale 29s. 9d. to 32s. 0d. per unit; over 6 per cent. C, £92 10s. 0d. to £93 0s. 0d., basis 60 per cent. Cr, scale 29s. 9d. to 32s. 0d. per unit; 2 per cent. C,* 2s. 1d. per lb. Cr; 1 per cent. C,* 2s. 1½d. per lb. Cr; 0.15 per cent. C,* 2s. 2½d. per lb. Cr; 0.10 per cent. C,* 2s. 2¾d. per lb. Cr; 0.06 per cent. C,* 2s. 3d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 7s. 0d. to 7s. 6d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £249 0s. 0d.; 96/98 per cent., £259 0s. 0d. to £265 0s. 0d.

Ferro-columbium.—65/75 per cent., Nb + Ta, 22s. 6d. to 23s. 6d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £66 0s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £28 19s. 0d.; tested, 0.08 to 0.25 per cent. C, £29 19s. 0d.; hard (0.41 to 0.60 per cent. C), £31 0s. 6d.; silico-manganese, £39 10s. 0d.; free-cutting, £33 3s. 0d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £36 14s. 6d., silico-manganese, £39 17s. 6d.

* Average 68-70 per cent.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £34 13s. 6d.; basic, hard, over 0.41 up to 0.60 per cent., C, £35 16s. 0d.; acid, up to 0.25 per cent. C, £38 17s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £35 7s. 0d.; boiler plates (N.-E. Coast), £37 17s. 0d.; floor plates (N.-E. Coast), £36 16s. 0d.; sectional material, N.-E. Coast, £33 16s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested (4-ton lots), £36 3s. 0d.; flats, 5 in. wide and under (4-ton lots), £36 3s. 0d.; hoop and strip, £36 12s. 6d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £38 16s. 0d.; black sheets (hand mill), 17/20 g., £50 4s. 6d.; galvanized corrugated sheets, 24 g., £62 7s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £61 13s. 9d.; nickel-chrome, £85 10s. 6d.; nickel-chrome-molybdenum, £96 16s. 6d.

NON-FERROUS METALS

Copper.—Cash, £317 0s. 0d. to £318 0s. 0d.; three months, £316 0s. 0d. to £316 10s. 0d.; settlement, £318 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 3s. 0½d. per lb.; rods, 348s. 3d. per cwt. basis; 20 s.w.g., 381s. 3d. per cwt.

Tin.—Cash, £774 0s. 0d. to £775 0s. 0d.; three months, £770 0s. 0d. to £771 0s. 0d.; settlement, £775 0s. 0d.

Lead (Refined Pig).—First half August, £117 10s. 0d. to £117 15s. 0d.; first half November, £115 10s. 0d. to £115 15s. 0d.

Zinc.—First half August, £96 15s. 0d. to £97 0s. 0d. first half November, £95 5s. 0d. to £95 10s. 0d.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £127 15s. 0d.; rolled zinc (boiler plates), all English destinations, £125 10s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £110.

Brass Tubes, etc.—Solid-drawn tubes, 2s. 5½d. per lb.; rods, drawn, 3s. 3¾d.; sheets to 10 w.g., 323s. 0d. per cwt.; wire, 3s. 1½d.; rolled metal, 308s. 0d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), — ; B6 (85/15), — ; BS249, —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), — ; HTB2 (38 tons), — ; HTB3 (48 tons), — .

Gunmetal.—BS1400, LG2 (85/5/5/5), — ; LG3 (86/7/5/2), — ; G1 (88/10/2/½), — ; (88/10/2/1), — .

Phosphor Bronze.—BS1400, PB1 (AID released), — per ton.

Phosphor Bronze Strip, etc.—Strip, 446s. 3d. per cwt.; sheets to 10 w.g., 470s. 9d. per cwt.; wire, 4s. 5½d. per lb.; rods, 3s. 11½d.; tubes, 3s. 9½d.; chill cast bars: solids 3s. 11d., cored 4s. 0d. (CHARLES CLIFFORD, LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 4s. 2½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 7d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 6d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 4d. per lb. Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £84 0s. 0d. Nickel, £519 0s. 0d. Aluminium ingots, £190 10s. 0d.; aluminium bronze (BS1400), AB1, — ; AB2, — . Solder, brazing, BS1945, type 8 (50/50), 3s. 1d. per lb., type 9 (54/46), 3s. 4¼d. per lb.

House Organs

Follsain-Wycliffe Newsletter: Issued by Follsain-Wycliffe Foundries, Limited, Lutterworth, near Rugby.

This is a very special edition as it celebrates the 50th anniversary of the establishment of the company, and on this important event congratulations are offered. When a representative of the Journal visited the works in 1932, the Follsain process had just been inaugurated, and he met one of the inventors, Mr. Folliet. This issue of the house organ carries quite a detailed history of the works, but, as it is pointed out, the strength of the company lies in servicing a multiplicity of industries. The magazine, which is published in the interests of the workpeople, is a very creditable production.

Bradley's Magazine—Summer 1956. Issued by Bradley & Foster Limited, Darlaston Ironworks, Darlaston, S. Staffs.

In this issue there is a first-class article dealing with the pearlitic cast irons. It is announced, that new chemical, spectrographic, physical, and research laboratories are being built at Darlaston.

S. & W. Magazine, Vol. 8, No. 3. Issued by Smith & Wellstood Limited, Bonnybridge, Scotland.

This issue records the visit of the Rt. Hon. Lord Strathclyde, Minister of State for Scotland, to the works. He was presented with a filigree cast plaque made by one of the apprentices.

Changes of Name

Among the companies which have recently changed their names are those listed below. The new titles are given in parentheses.

BRANDONFORD, LIMITED, Queen Anne Street, London, W.1 (M. C. Ritchie (Engineers), Limited).

K.D.G. (SALES), LIMITED, Old Broad Street, London, E.C.2 (Anglo-Dutch Metal Company, Limited).

ADAMFORT ENGINEERING, LIMITED, Leighton Avenue, Pinner, Middx (Adam Port Engineering, Limited).

BLACKER FORGE & HAMMER COMPANY, LIMITED, Knowl Street, Stalybridge (Staley Iron Works, Limited).

DURTNALL & HIPWELL, LIMITED, Broad Street Place, London, E.C.2 (D. & H. Metal Treatments, Limited).

NELTON MACHINE TOOLS (COVENTRY), LIMITED, Brandon Road, Binley, Coventry (Coventry Food Machinery, Limited).

ASHLIVIL ENGINEERING COMPANY, LIMITED, Bridge Road, St. Austell (W. C. Davies & Partners (St. Austell), Limited).

CABLE JOINTERS & ENGINEERING, LIMITED, Chatsworth Gardens, Westerhope, Newcastle-upon-Tyne (Cables & Constructions, Limited).

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference BSB can be obtained from the Board of Trade Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone: CHAncery 4411, ext. 738 or 771), unless otherwise stated.

BURMA, August 17—Cast-iron piping and pipe fittings, for the Director-General, Union of Burma Purchase Board, Rangoon. (BSB/19316/56.)

DUNDEE, August 15—Rails, fishplates, wire crane ropes, wrought-iron chains, iron castings, etc., for the Dundee Harbour Trust. Mr. Alexander Smith, general manager and engineer, Dundee Harbour Trust, Harbour Chambers, Dock Street, Dundee.

LOW PHOSPHORUS
REFINED & CYLINDER
HEMATITE
MALLEABLE
DERBYSHIRE
NORTHAMPTONSHIRE
SWEDISH CHARCOAL

PIG-IRON

WILLIAM JACKS & CO. LTD.
LONDON, E.C.2.
Winchester House, Old Broad Street
London Wall 4774 (6 lines)

FERRO SILICON 12/14%
ALLOYS & BRIQUETTES
N.F. METALS & ALLOYS
LIMESTONE
GANISTER
MOULDING SAND
REFRACTORIES

And at :—

BIRMINGHAM, 2. 39, Corporation St., Midland 3375/6
LIVERPOOL, 2. 13, Rumford St., Central 1558
GLASGOW, C.2. 93, Hope Street, Central 9969

CLASSIFIED ADVERTISEMENTS

PREPAID RATES: Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Numbers 2/6 extra (including postage of replies.) Situations Wanted 2d. per word.

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

EXPERIENCED GREY IRON FOUNDRY MANAGER (48), desires appointment. Free to join immediately. Accustomed to full control. Experienced modern fully mechanised plants, employing modern production methods, of light, and medium to heavy castings up to 10 tons.—Box EG230, FOUNDRY TRADE JOURNAL.

FOUNDRY WORKS MANAGER requires change. Conversant with mechanised plant, floor moulding, shell moulding, core-blowing, quoting and sales. Grey iron.—Box FW237, FOUNDRY TRADE JOURNAL.

FOREMAN PATTERNMAKER (40) desires change. Experienced in Shipbuilding and Engineering, Machine Tool and Aero and Motor Industry. Also Foundry experience. Keen on making advancements, free for anywhere in the country. Box FP247, FOUNDRY TRADE JOURNAL.

FOUNDRY EXECUTIVE (48) desires change; health reasons. 14 years Foundry Manager with firm of repute producing sand and shell moulded repetition grey iron castings. Would consider Technical Representation Foundry Suppliers or similar. Resident Yorkshire, where four figure salary available in exchange for ability and conscientious application.—Box FE226, FOUNDRY TRADE JOURNAL.

METALLURGIST/FOUNDRY TECHNOLOGIST (28), H.N.C., desires progressive position in London. S. or S.E. England. Experienced high duty iron, cupola, sand control; modern foundry methods.—Write Box MF234, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

MACHINE MOULDER wanted.—MOYLE, Iron Foundry, Kingston-on-Thames.

SAND FOUNDRY ESTIMATOR and PLANNING ENGINEER required in Ferrous and Non-ferrous Foundry. Pension Scheme operated. State age and salary required to PERSONNEL MANAGER, Kent Alloys Ltd., Rochester, Kent.

FOREMAN required for Whitemetal Die Casting Dept. Must be fully experienced and be strict disciplinarian. House available for suitable applicant.
Apply giving details of experience in chronological order to :—
The Anti-Attrition Metal Co., Ltd.,
Woodlands Park Works,
Maidenhead, Bercks.

FOREMAN required for Hand Moulding Section, Non-ferrous Foundry, must be first class Moulder, strict disciplinarian and able to produce high quality castings. House or Flat available for suitable applicant.
Apply giving details of experience in chronological order to :—
The Anti-Attrition Metal Co., Ltd.,
Woodlands Park Works,
Maidenhead, Berks.

SITUATIONS VACANT—*contd.*

FETTLING SHOP FOREMEN (2) required by Catton & Co., Ltd., for their steel foundry DRESSING SHOPS. Steel dressing experience desirable but experience in allied fields would be considered. Alternate night shift working essential for one appointment and reference to willingness to work this should be given in replies. Pension scheme and assistance with house purchase if necessary. Replies to CATTON & CO., LTD., Leeds, 10.

ESTIMATOR required with experience in foundry and pattern making practice. Applications in writing to give age, experience and present salary to G. D. PETERS & CO., LTD., Windsor Works, Slough, Bucks.

FOUNDRY SUPERINTENDENT. Applications are invited for this post in a well-known iron foundry in Central Scotland about to embark on a wide scheme of modernisation. Applicants should preferably have had experience in light castings work and the operation of mechanised plant. A four-figure salary commensurate with ability and experience is envisaged. Box FS258, FOUNDRY TRADE JOURNAL.

SALES REPRESENTATIVE

WELL-ESTABLISHED, steadily developing firm of boot manufacturers require a Sales Representative to sell Industrial Safety Footwear in the North of England.
Experience in selling footwear not necessary, but qualities of salesmanship essential.
Full particulars to Box WE259, FOUNDRY TRADE JOURNAL.

STEEL FOUNDRY GENERAL FOREMAN (Assistant Manager) required by a large Canadian company with diversified foundry operations on castings for heavy machinery. Steel castings output 350 to 700 tons monthly from small, machine moulded up to pit work weighing 12 tons and over. Recently built, well equipped foundry. Principal duties to assist Superintendent by supervising departmental foremen in the fields of daily operation and handling of working force, production to schedules, labour and overhead costs. Incentive plan for working force and foremen. Should be familiar with present day methods and able to train personnel. Must be qualified as a potential superintendent. Passage assisted. Box SF248, FOUNDRY TRADE JOURNAL.

WORKING CHARGE HAND FETTLER required to organise small Fettling Shop, with five operatives handling about 5 tons mixed castings per day. Good wages, plus bonus, plus New 3-Bedroomed Unfurnished House to successful applicant after trial period.—Write, preferably enclosing one recent reference, to THOMAS LAKE & CO., LTD., Newport Foundry, Barnstaple, Devon.

SITUATIONS VACANT—*contd.*

FOUNDRY TECHNICAL ASSISTANT required for 50-ton per week iron-foundry, to take charge of routine technical control and to assist with new developments. Interesting position, with good prospects.—Write in confidence, giving age, experience, and salary required, to Box FT227, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN, experienced executive for Roll Foundry and other castings.—State experience, qualifications, and wages required, Box FF274, FOUNDRY TRADE JOURNAL.

LONG-ESTABLISHED Firm of Die-Casters requires SALESMEN to sell Zinc Base Alloy Pressure Die-Castings, and Aluminium Alloy Gravity Die-Castings, on a straight commission basis. Please state fully details of other lines carried, area at present covered, and commission required. Box LE257, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER required for medium size Jobbing Foundry, Merseyside. Personnel 40/50. Capacity 15/18 tons C.I., 5/6 tons N.F. Metallurgical experience an advantage. Box FM254, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN required for medium size Jobbing Foundry, Merseyside. Personnel 40/50. Capacity 15/18 tons C.I., 5/6 tons N.F. Metallurgical experience an advantage. Box FF255, FOUNDRY TRADE JOURNAL.

WEIGHT ESTIMATOR required for bronze department of large Non-ferrous Foundry in South-East London. Previous experience in this field of weight estimating essential. Applicants should state details of education, experience, etc. Good working conditions. Pension scheme and up-to-date restaurant.—Replies to Box WE240, FOUNDRY TRADE JOURNAL.

INDIA. A progressive Steel Foundry in India requires the following personnel:
1. FOUNDRY SUPERINTENDENT to organise, co-ordinate and control the entire production side of Foundry and to assist in Expansion Project. Salary between £2,000—£3,000 p.a. is envisaged but further consideration will be given to exceptional applicant.
2. FOUNDRY TECHNICIAN to improve castings methods, reduce scrap and design production tackle.
3. SKILLED PATTERNMAKER with administrative experience and ability to train craftsmen, to take complete charge of Patternshop.
Engagement on the basis of a 3-5 year contract. Interviews in London and Sheffield. Company will finance return passages for self, wife and one child. Applications stating age, qualifications and salary required, should be sent with photograph to THE SECRETARY, Indian Chamber of Commerce in Gt. Britain, 20, Wormwood Street, London, E.C.2.